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Chief Instructor, New College, R.M.A.S.

# **Infantry Training**

**Volume I**

**INFANTRY PLATOON WEAPONS**

**PAMPHLET No. 9**

**PART II**

**3.5-INCH ROCKET LAUNCHER**

**1953**

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(i)

## CONTENTS

SECTION	Page
1. Introduction .. .. .	5
2. Tactical handling .. .. .	7
3. Training and instructional lessons :—	
<i>Lesson 1.</i> Assembling, stripping, care and cleaning .. .. .	9
<i>Lesson 2A.</i> Sightsetting and aiming—ladder pattern sight .. .. .	15
<i>Lesson 2B.</i> Sightsetting and aiming—ellipse pattern sight .. .. .	24
<i>Lesson 3.</i> Firing positions, loading and unloading .. .. .	32
<i>Lesson 4.</i> Firing and action on misfire ..	36
<i>Lesson 5.</i> Handling .. .. .	40
<i>Lesson 6.</i> Zeroing .. .. .	44
4. Ranges and safety precautions for practice firing	50

## LIST OF PLATES

PLATE					
1.	The launcher in its stored condition	..	..	..	1
2.	Separating the barrels	..	..	..	1
3.	Connecting the barrels	..	..	..	2
4.	The launcher assembled	..	..	..	3
5.	HE and practice rockets	..	..	..	4
6.	First kneeling position	..	..	..	59
7.	Second kneeling position	..	..	..	59
8.	Removing the safety band	..	..	..	60
9.	Securing the long contact wire to the contact spring	..	..	..	60
10.	First sitting position	..	..	..	61
11.	Second sitting position	..	..	..	61
12.	The standing position	..	..	..	62
13.	The lying position	..	..	..	62



(ii)

## LIST OF FIGURES

FIGURE	Page
1. The sight (ladder pattern) .. .. .	17
2. The sight pattern (ladder pattern).. .. .	18
3. Stationary target at 100 yards .. .. .	19
4. Directly approaching at 100 yards .. .. .	20
5. Direct crosser—20 mph at 100 yards—left to right .. .. .	21
6. Oblique crosser approaching—45 degrees—20 mph at 100 yards—left to right .. .. .	22
7. Oblique crosser moving away—45 degrees—20 mph at 100 yards—right to left .. .. .	22
8. Oblique crosser moving away—wide angle—20 mph at 100 yards—right to left.. .. .	23
9. The sight (ellipse pattern) .. .. .	25
10. The sight pattern (ellipse pattern).. .. .	26
11. Correct aim—stationary tank .. .. .	27
12. Correct aim—crossing tank—20 mph .. .. .	28
13. Correct aim—oblique crosser—45 degrees—20 mph .. .. .	29
14. Correct aim—oblique crosser—less than 45 degrees—20 mph .. .. .	30
15. Correct aim—oblique crosser—more than 45 degrees—30 mph .. .. .	31
16. The testing target .. .. .	45
17. The bore sights .. .. .	46
18. Danger area—stationary targets—single line of fire .. .. .	52
19. Danger area—stationary targets—arc of fire .. .. .	53
20. Danger area—moving targets .. .. .	54
21. Vulnerable parts of a tank .. .. .	57
22. Improvised bracket for aiming instruction .. .. .	58

1

PLATE 1.—The launcher in its stored condition

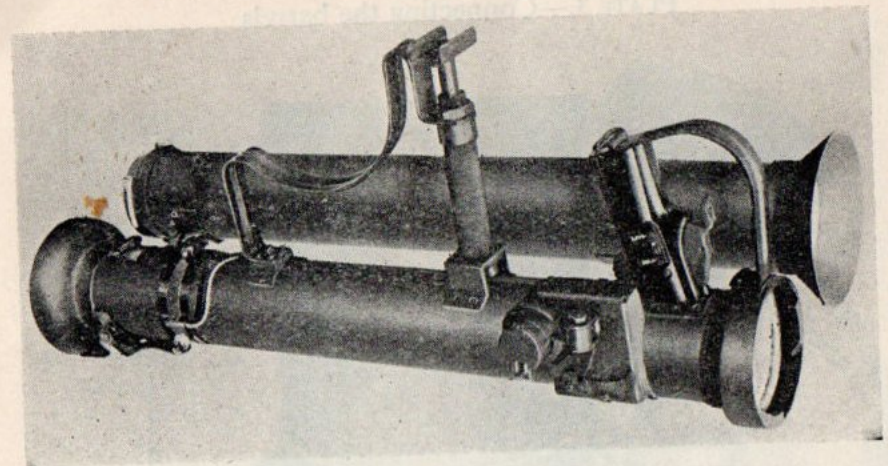


PLATE 2.—Separating the barrels

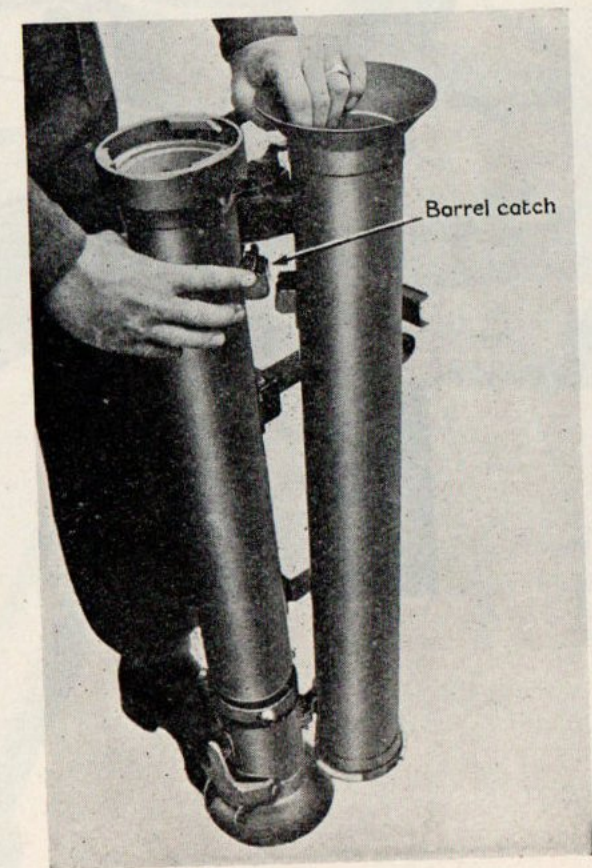




PLATE 3.—Connecting the barrels

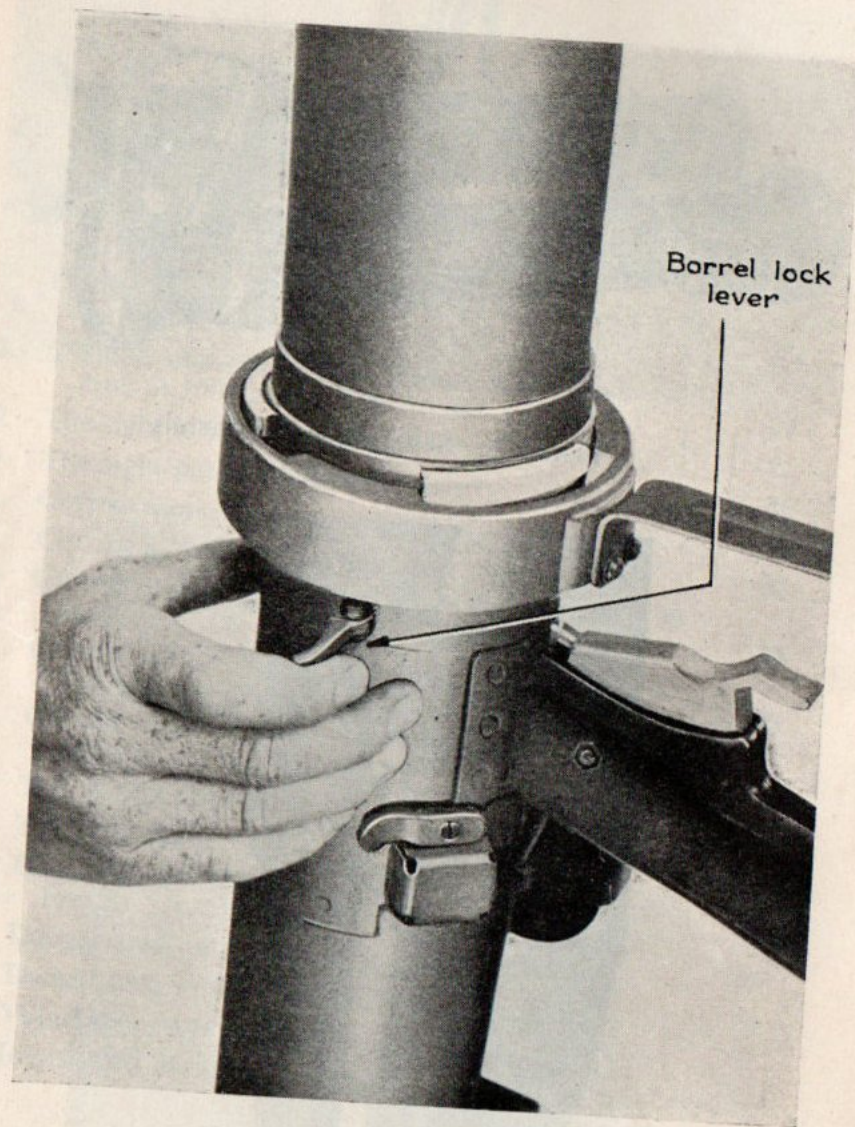


PLATE 4.—The launcher assembled

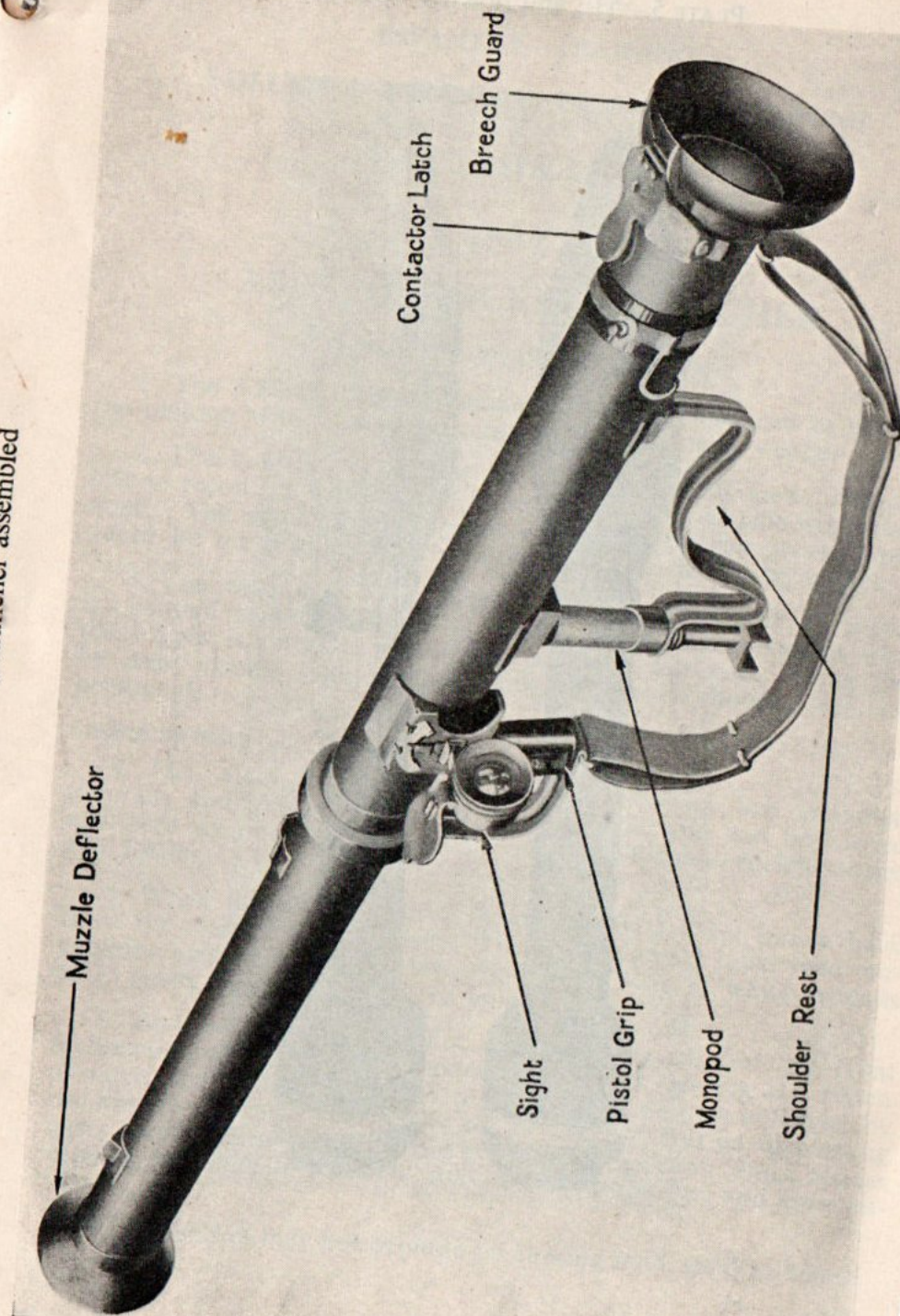
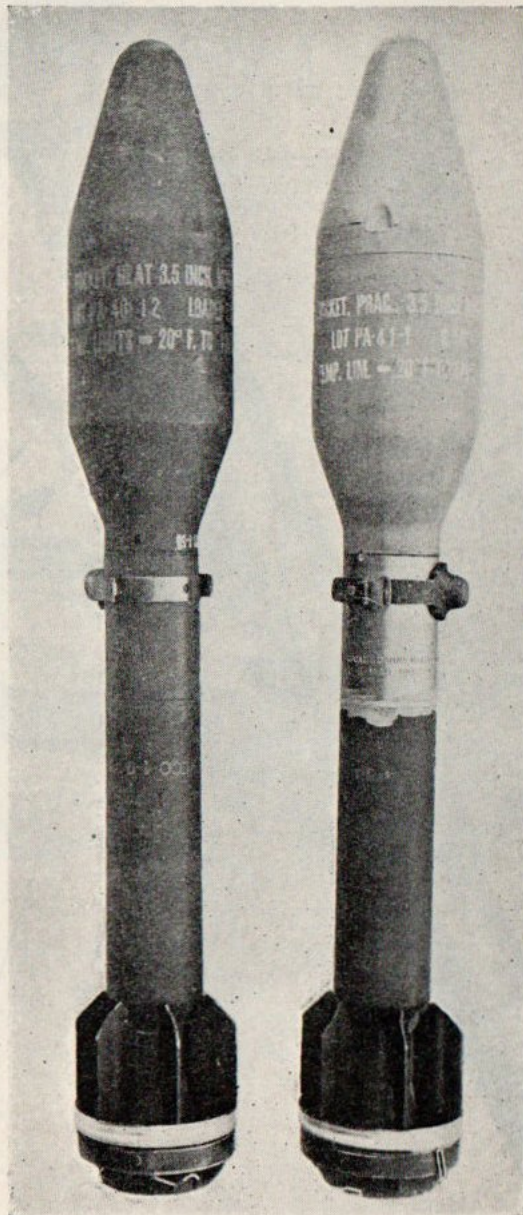




PLATE 5.—HE and practice rockets



RESTRICTED  
INFANTRY TRAINING

VOLUME I—INFANTRY PLATOON WEAPONS

PAMPHLET No. 9

PART II

3.5-INCH ROCKET LAUNCHER

Section 1.—INTRODUCTION

1. The 3.5-inch rocket launcher has been introduced to provide the platoon with a powerful and effective anti-tank weapon.

2. The launcher is a light shoulder-controlled open tube, and has no recoil. It can be fired in any of the normal rifle firing positions. The actual motive force is obtained by gas pressure produced by the burning of a propellant charge inside the rocket.

3. The weapon is fired electrically by a small magneto which is operated when the trigger is pressed, and in some models when the trigger is released. Although primarily anti-tank, it can also be used against gun emplacements, pill boxes, houses, etc, and personnel.

**Characteristics**

4. The main characteristics of the weapon are mobility, accuracy and hitting power. It weighs 15 lb, and can be carried and fired by one man, but needs a second man as rocket carrier and loader.

5. When the rocket is fired, gases and flames are blown back from the rear of the launcher. The Nos. 1 and 2 must take precautions against this back-blast, the danger zone of which extends to 25 yards from the rear of the launcher.

6. *Performance.*—The rocket will penetrate all but the front of the hull and turret of the heaviest known tank (see Fig 21). When a rocket strikes the outside of a tank, penetration is achieved by the impact of a high velocity jet on the armour; this jet of burning gases and molten metal is projected into the tank and, besides causing casualties to the crew, may set fire to the fuel and ammunition.

7. The rocket may not explode on striking mud, sand or water.



8. *Effective range.*—Although the maximum range of the rocket is 960 yards, the maximum effective fighting range against tanks with visual range estimation is 150 yards. With more accurate means of obtaining the range, this distance can be increased.

9. *Carriage.*—When out of contact with the enemy, the launcher is carried over either shoulder, by means of a sling. When action is imminent it is assembled ready for firing, and should be carried in such a way as to make it as inconspicuous as possible. When not in use the launcher breaks down into two parts, which are clamped side by side and carried in the company HQ carrier.

#### Scale of issue

10. Three launchers are issued to each company and are allotted to platoons as required.

11. Rockets are carried in the company HQ carrier.

12. Each rocket team carries six rockets per launcher. Six rockets per launcher are carried in F echelon, and eight in unit first line reserve.

#### Ammunition and packing

13. The HE AT rocket weighs about  $8\frac{1}{4}$  lb and is a complete unit ready to fire. It consists of a head, a fuze, a motor and fin assembly. It is just over  $23\frac{1}{2}$  inches long and has a muzzle velocity of 340 feet per second.

14. HE AT rockets are coloured green with the following markings:—

(a) On the head (in yellow):—

- (i) Type and mark of rocket.
- (ii) Method of filling, filling station and date.

(b) On the motor:—

- (i) A red band where the motor joins the fuze.
- (ii) Temperature limitations, within which it is safe to fire the rocket, in red within a red circle.
- (iii) Type, mark of motor, and batch number in yellow.

The contact ring is unpainted.

15. Practice rockets, which have the same dimensions and performance as the HE AT rockets, except that they do not explode on impact, have a blue head and a green motor and tail, with the following markings:—

(a) On the head in white:—

- (i) Type and mark of rocket.
- (ii) Method of filling, filling station and date.

(b) On the motor:—

- (i) A red band where the motor joins the fuze.
- (ii) Temperature limitations, within which it is safe to fire the rocket, in red within a red circle.
- (iii) Type, mark of motor, and batch number in yellow.

The contact ring is unpainted.

16. Practice rockets may have an inert filling, or may be manufactured to the required weight and have no filling.

17. It should be noted that the basic colour and the markings of the motor with both service and practice rockets are similar. The marking details of the batch numbers may differ according to whether the fuze is service or inert.

18. Drill rockets are normally made of wood and will not be painted or coloured. If recovered undamaged, practice rockets may be reconditioned and used for drill purposes; they will be painted white.

19. The following markings indicate the type of rocket:—

- UK M28 Mark 1 are HE AT rockets (British).
- UK M29 Mark 1 are practice rockets (British).
- M28 or M28 A1 are HE AT rockets (United States).
- M29 or M29 A1 are practice rockets (United States).

20. Rockets are packed singly in metal containers. British rockets are packed four, and United States three, in a wooden box. The metal containers are painted with markings to indicate the type of rocket they contain. These markings are similar to those painted on the rocket.

#### Facial protection for the firer

21. From experience gained in firing the rocket at colder temperatures it has been found that particles of unburnt propellant will sometimes blow back into the firer's face, causing slight pin-pricks. For this reason face masks are being issued to protect the firer's eyes. They will be worn on all occasions when there is a possibility of unburnt propellant entering the eyes of the firer and thus affecting the efficient operation of the weapon. The greatest possibility of unburnt particles of propellant being blown back is when the temperature is below 60 degrees Fahrenheit.

#### Section 2.—TACTICAL HANDLING

1. The primary role of the launcher is to kill tanks. The power of the HE AT rocket is used to the full in this role, for which it was designed.

2. The secondary role, in which it can be used with good effect, is against heavy weapons and artillery; stone, concrete or log fortifications and emplacements; river boats and ferries; MT; groups



of men, and in street fighting. Owing to the danger of running out of ammunition, the launcher will not be employed in its secondary role when there is a possibility of an attack by tanks developing in the area.

3. Owing to the low velocity and high trajectory of the rocket, accurate judging of distance is vital.

4. It is possible to fire from within buildings, but great care must be taken to see that the back-blast does not endanger our own troops. The back-blast will penetrate a plaster wall very easily.

5. The launcher will draw enemy fire, and therefore must be concealed. When it is carried by day, camouflage nets can be used.

6. The launcher team must remain concealed and quiet until the last possible moment. Fire should be held until a kill is certain.

7. Launcher teams must be aware of probable enemy tank tactics and devices which are used to make the anti-tank weapons open fire prematurely, thus disclosing their positions.

8. Launcher teams must expect enemy tanks to move at speeds of ten to 20 miles per hour on roads and five to ten miles in open country.

9. Arrangements must be made for ammunition supply, especially if rockets have been used against targets other than tanks.

10. When siting the weapon for its primary role, the following points must be considered:—

(a) The field of fire must depend upon the ground. All types of tanks can be hit up to 150 yards, and when the range is accurately known this distance can be increased.

(b) The necessity of gaining surprise and the consequent importance of a carefully concealed position. In dry and dusty climates the area of back-blast should be well watered or matted to prevent excessive dust or grass fires.

(c) The desirability of shooting tanks in the sides or rear.

(d) A fire position defiladed from the front, as well as from the flanks, both from fire and view.

(e) When in the open, the kneeling position is the best, but whenever possible the launcher should be fired standing, from a fire trench or suitable position which will give protection from ground and air, and should be of such a shape and size that Nos. 1 and 2, their equipment, launcher, ammunition, etc, are immune from being crushed by a tank.

(f) The noise and flash of the launcher in action may well give its position away; therefore, alternative positions will be prepared since, unless a "kill" is obtained, the launcher team may have to move to an alternative position immediately after firing the first rocket.

(g) The possibility of siting launcher teams in pairs, and in depth, mutually supporting each other along avenues of likely tank approach.

(h) As there is the possibility of enemy infantry preceding an enemy tank attack, launcher positions must be sited within the protective positions of a platoon.

11. Positions sited for the secondary role would need a longer field of fire.

12. A good anti-tank position should not be jeopardized by attempting to engage secondary role targets.

### Section 3.—TRAINING AND INSTRUCTIONAL LESSONS

#### The training syllabus

1. All ranks of a rifle company and all ranks of other units and formations armed with the 3.5-inch rocket launcher, should be trained in its use.

2. The aim of the syllabus should be to train all ranks to hit a tank on the move at ranges up to 150 yards, and stationary up to 300 yards, and to be able to maintain and fight the weapon in action.

3. Subjects necessary to achieve this aim are:—

(a) The instructional lessons laid down in this section.

(b) Advanced handling exercises.

(c) Firing practice with both practice and live rockets as often as supplies of rockets will allow.

(d) Practice in estimating the range, speed and direction of movement of tanks, and in recognition of their vulnerable parts.

#### LESSON 1.—ASSEMBLING, STRIPPING, CARE AND CLEANING

##### *A. Instructor's Notes*

#### Aim

1. To teach the assembling, stripping, care and cleaning of the 3.5-inch rocket launcher.

#### Stores

2. One or more rocket launchers per squad, cleaning rags, oil, any rod suitable for cleaning the barrel, drill rockets (if available), diagrams of HE AT and practice rockets.



### Instructional knowledge

3. Assembly is taught first, as the launcher is normally kept in its "stored" condition, with both parts of the barrel clamped side by side.

4. No attempt will be made to teach the detail of the sight or trigger mechanism, as these will be dealt with in detail in a later lesson.

5. Instructors requiring a more technical knowledge of the 3.5-inch rocket launcher and rockets will find this information in the User Handbook. The aim of the User Handbook is to give officers, warrant officers and NCOs a more technical knowledge of the mechanism of the launcher and rockets. Men will NOT be taught more than is contained in the lessons in this pamphlet.

6. It will be found, on occasions, that names of certain parts differ between this pamphlet and the User Handbook. The names as laid down in the User Handbook are for issue and identification purposes. Some have been described briefly in this pamphlet in order to simplify instruction.

7. There are constructional differences between British and United States made launchers which do not affect instruction. In addition, early patterns of United States made launchers were fitted with a bipod.

The latest British and United States launchers will have no bipod, but will retain the original monopod and shoulder rest. Later United States launchers may have a new design of shoulder rest to replace the original type with monopod.

8. Earlier United States models were fitted with a number of different pattern sights, the most common being the ellipse (*see Lesson 2B*). The latest British and United States models will be fitted with the ladder pattern sight (*see Lesson 2A*).

9. With earlier pattern launchers the safety switch is on the rear of the pistol grip, "FIRE" being at the bottom and "SAFE" at the top. The magneto will function when the trigger is pressed and again when it is released.

10. The latest British and United States launchers have the safety switch on the left side of the pistol grip, "FIRE" being at the top and "SAFE" at the bottom. The magneto does NOT function when the trigger is released, nor, when the safety switch is at "SAFE", can the trigger be pressed; with earlier United States models the trigger can be pressed but the launcher will not fire.

### B. Conduct of the Lesson

#### Preliminaries

11. Make sure that there are no live or practice rockets on parade.

#### Approach

12. The 3.5-inch rocket launcher has been produced to provide the platoon with an anti-tank weapon capable of knocking out the most heavily armoured tank in existence.

#### Characteristics

13. Explain.—The weapon is a shoulder-controlled open tube, and has no recoil. It is designed to knock out enemy tanks, and is light, mobile, accurate and hard hitting. It weighs 15 lb and fires a HE AT rocket weighing 8½ lb.

14. It can be carried and fired by one man, but an assistant is required to help in loading.

15. The maximum range is 960 yards, but its effective fighting range against tanks, using visual range estimation, is 150 yards. With more accurate means of obtaining the range this distance can be increased.

16. Whatever the range, it will penetrate all but the front of the hull and turret of the heaviest known tank (*see Fig 21*) and a considerable thickness of masonry or wood. The rocket may not explode if it strikes mud, sand or water.

17. When fired there is a large flash from the rear of the weapon. The danger zone of this flash is in the form of a triangle with a length and base of 25 yards with its apex touching the rear of the launcher. No person or large solid object must be within this danger zone when the weapon is fired.

18. The weapon is electrically fired and generates its own power from a small magneto in the pistol grip. The rocket is propelled by a rocket motor.

19. Question the squad.

#### Assembling and stripping

20. Explain.—The launcher will normally be stored with the two half-barrels clamped side by side; this is the normal condition for carrying when action is not expected (*see Plate 1*).

21. *Assembling for firing* (*see Plate 2*).—Explain and demonstrate:—

(a) Place the breech guard, which is on the rear half of the barrel, on the left boot, with the monopod facing the left rear.



- (b) Grasp the top half of the barrel with the left hand, fingers inside the muzzle deflector, the right hand holding the lower half with the forefinger on the barrel catch.
- (c) Raise the catch and separate the barrels, by lifting the front barrel to disengage the hook on the front barrel from the eye on the rear barrel (see Plate 3).
- (d) Transfer the forefinger of the right hand to the barrel lock lever, and pull it fully to the rear.
- (e) Lift the front half barrel and put the rear end into the front end of the rear barrel. Make sure that the coupling screw and nut are engaged, and then turn the front half barrel clockwise as far as it will go.
- (f) Release the barrel lock lever. No attempt must be made to force the barrel lock lever flush against the side of the barrel.
- (g) The monopod (if fitted) can be extended or retracted by turning the roughened portion of the sleeve.

22. The launcher is now assembled ready for firing (see Plate 4).

### Stripping

23. Explain and demonstrate:—

- (a) Retract the monopod (if fitted).
- (b) Place the breech guard on the left boot.
- (c) Grasp the front barrel with the left hand, fingers inside the flash deflector. Grasp the lower half with the right hand, with the forefinger pulling back the barrel lock lever.
- (d) Turn the front barrel anti-clockwise and lift clear; release the barrel lock lever.
- (e) Place the barrel hook in the eye of the lower barrel and pull barrels together; this will cause the barrel catch to become engaged.

24. Practise squad in assembling and stripping (last man leaves the launcher assembled).

25. Describe briefly:—

- (a) *Trigger and safety switch.*—Later models—safety switch on left of pistol grip. Bottom position marked "SAFE", top position marked "FIRE". Early models—safety switch on rear of pistol grip. Bottom position marked "FIRE", top position marked "SAFE".
- (b) *The sight.*—Rubber eye piece, protective cap, reflector lens.
- (c) *Contacting latch.*—To hold rocket in position when loaded.
- (d) *Breech guard.*—Protects the rear of the launcher, aids in loading and protects the contacting latch.
- (e) *Muzzle deflector.*—To protect firer from flash and particles of propellant.

26. Question the squad.

### Care and cleaning

27. *Daily cleaning.*—Explain and demonstrate. Except when in store the launcher should be cleaned daily as follows:—

- (a) Using a dry cloth and suitable rod, clean the inside of the barrel and re-oil, using oil OX 52.
- (b) Clean the outside with a dry cloth and re-oil.
- (c) The sight must be handled with care, and will not be stripped. The lens must be kept clean and dry, and the protective cap kept closed when the sight is not in use. Under no circumstances will polishing liquids or abrasives be used for polishing the lens, which must be cleaned with a clean linen cloth, used for this purpose only. The rubber eye guard should be washed occasionally with soap and water.

28. *Before firing.*—Explain and demonstrate. Thoroughly clean and dry the weapon and inspect:—

- (a) Inside of barrel, for rust, scale or dents.
- (b) Monopod, for correct working.
- (c) Sight, for damage and correct working.
- (d) Contacting latch blade and contacting springs, to ensure freedom from rust, paint and grease. Emery cloth No. 00 may be used to ensure that the contact parts are clean.
- (e) Outside of barrel, to ensure that electric wires are not broken or loose, that there is no chipped paint-work or loose parts, and that all catches and levers are working correctly.

29. Any part found damaged or defective will be repaired by the armourer.

30. *After firing.*—Explain that the barrel will be cleaned as follows:—

- (a) Using a suitable rod and oily mop, clean out the barrel.
- (b) Dry and re-oil.
- (c) Thoroughly clean the remainder of the launcher, dry and oil.

31. This cleaning must be carried out daily for three days after firing.

32. *Weekly.*—Explain and demonstrate. Once a week the following parts will be thoroughly cleaned and oiled:—

- (a) Contacting latch pivot pin.
- (b) *Toggle pin hole.*—This is situated behind the trigger and covered by a felt pad. Pull back the felt pad and pour on the toggle pin one spoonful of oil from the rifle oil bottle.



33. *Extreme climates*.—Explain:—

- (a) *Moist or salty*.—Oil frequently, particularly the trigger mechanism. Watch for rust and keep launcher covered.
- (b) *Sandy or dusty*.—Keep dry, and clean frequently.
- (c) *Extreme cold*.—Oil sparingly, using oil OX 13, all unpainted surfaces, keep the weapon covered and, if it is taken into a heated building, dry out and re-oil.

34. Practise the squad and question.

#### Rockets (see Plate 5)

35. Explain and demonstrate by diagram. The rocket consists of a rocket head which contains the charge, a fuze, a rocket motor and tail fins. Point out those additional parts that will be handled in later lessons.

36. There are two types of rocket, identified as follows (see also Section 1, Ammunition and packing):—

- (a) HE AT are coloured green with yellow markings UK B28 Mark 1 or, if of United States manufacture, M28 or M28 A1.
- (b) Practice rockets.—Rocket head and fuze blue with white markings UK M29 Mark 1 or, if of United States manufacture, M29 or M29 A1. Motor and tail green with yellow markings. Practice rockets are similar in performance to the HE AT except that they do not explode on impact.
- (c) With both types of rocket the temperature limitations, within which it is safe to fire the rocket, are marked on the motor in red within a red circle.

37. Drill rockets can be made of wood; they will not be painted. Practice rockets which are recovered undamaged and reconditioned, can be used for drill. They will be painted white.

#### Packing

38. Rockets are packed in individual metal containers, which in turn are packed in wooden boxes. British packing is four to a box. United States rockets are packed three to a box. The outsides of the metal containers are painted to indicate the type of rocket contained.

39. Question the squad.

#### General functioning of the rocket

40. The rocket head contains a shaped charge designed to knock holes in tanks. Penetration is achieved by the impact of a high velocity jet of burning gases on the armour, and this jet, together with molten metal, is projected into the tank. This, besides causing casualties to the crew, may set fire to the fuel or ammunition.

#### Conclusion

- 41. Questions to and from the squad.
- 42. Practice on weak points.
- 43. Sum up.

#### LESSON 2A.—SIGHTSETTING AND AIMING—LADDER PATTERN SIGHT

##### A. Instructor's Notes

#### Aim

1. To teach sightsetting and aiming at stationary and moving targets.

#### Stores

2. One or more launchers, six-foot table for each launcher, sandbags or some other type of rest, aim diagrams and tank silhouette targets as follows (see Figs 1 to 8):—

(a) One right and one left direct crosser.

(b) Oblique crossers:—

- (i) 45 degrees left and right crossing—advancing.
- (ii) 45 degrees left and right crossing—withdrawing.
- (iii) Narrow angle left and right crossing—advancing.
- (iv) Narrow angle left and right crossing—withdrawing.
- (v) Wide angle left and right crossing—advancing.
- (vi) Wide angle left and right crossing—withdrawing.

(c) One "head-on" and one "rear-on".

One white screen or a suitable vertical surface for pinning up silhouettes. One large diagram, about two feet square, of the sight pattern.

#### Instructional knowledge

3. Launchers may be fitted with several different types of sight; the range scale on the elevation plate will also differ. The British model is fitted with the ladder pattern sight and is dealt with in this lesson. The most common alternative is the ellipse pattern sight; this is taught in Lesson 2B. Instructors should only teach the sight with which they are issued.

4. The best method of teaching aiming is by drawing a large diagram of the sight pattern upon some transparent material, such as glass (a window pane) or talc. The tank silhouette can then be placed behind the diagram, thus giving the man the "sight picture" required. The "sight picture" is the important thing for the man to remember, not the words.



5. At some time during rocket launcher training, the men must be shown and practised in the following:—

- (a) The appearance of tanks at various ranges.
- (b) The speed of tanks at 5, 10, 15, 20, 25 and 30 mph.
- (c) The appearance of tanks approaching and withdrawing at narrow angle, 45 degrees and wide angle.

6. For elementary practice, silhouette tank targets should be pinned on a wall or screen ten yards from the launcher. Screens of different colours should be used to provide practice against different backgrounds. Overall dimensions of the target are:—

- (a) Crossers .. ..  $8\frac{1}{2}$  inches  $\times$   $3\frac{1}{2}$  inches.
- (b) Head and rear ..  $4$  inches  $\times$   $3\frac{1}{2}$  inches.

7. Efficiency with the ladder sight will only be gained by constant practice using actual moving targets. Every advantage must be taken of vehicles moving in the vicinity of the place of work.

*Note.*—For aiming instruction and practice an improvised bracket as shown in Fig 22 can be fitted to the standard rifle rest. The bracket is not an issue and must be made locally.

### B. Conduct of the Lesson

#### Preliminaries

8. Check that there are no live or practice rockets on parade. Have launchers assembled and placed on tables.

#### Approach

9. In order to obtain the greatest effect from the weapon, there must be accurate judging of distance, together with quick and accurate sightsetting and aiming. Using judging distance as the means of obtaining the range, the effective fighting range against tanks is 150 yards; this can, however, be increased if the exact distance to the tank is known.

#### Sightsetting (see Fig 1)

10. Explain and demonstrate. To position the sight for aiming:—

- (a) Pull the sight away from the barrel until it is at *right angles to the launcher*.
- (b) Raise the protective cap.

11. When not in use the protective cap will be lowered and the sight folded back to the barrel; care must be taken not to damage the rubber eye piece.

12. *The range scale.*—The range scale has one reading “0 to 450”, then readings from 5 to 9 denoting hundreds of yards. Readings are not needed between 0 and 5 as ranges up to 450 yards are on the sight pattern as seen through the sight. Between 5 and 9 the range scale is notched every 50 yards.

13. *To set the sights.*—For ranges up to 450 yards turn the sight until the indicator arm points to the “0 to 450” reading. For ranges of 500 yards and above the sight is moved until the indicator arm is set to the range required.

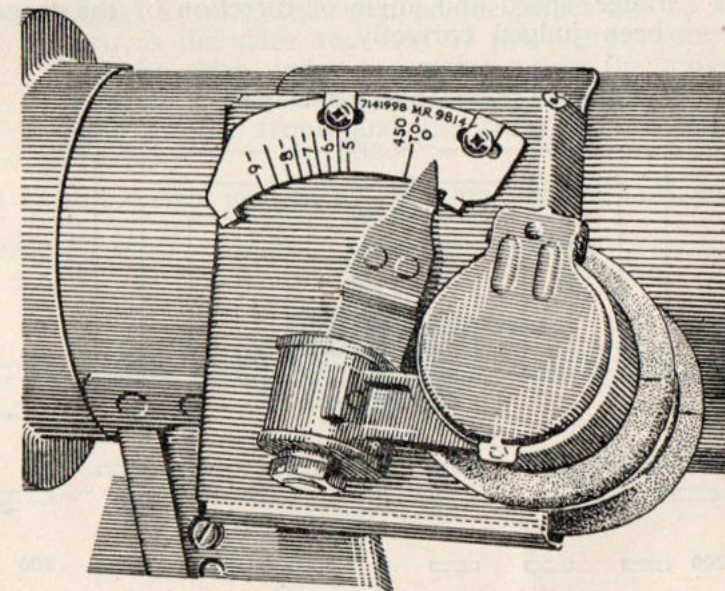


Fig 1.—The sight (ladder pattern)

14. Practise the squad in sight setting.

#### The sight pattern (see Fig 2)

15. Explain, with the aid of a diagram, the picture as seen through the sights:—

- (a) The sight has an interrupted vertical centre line, an interrupted horizontal zero line, and four interrupted horizontal range lines.
- (b) The length of each part of the vertical centre line and the distance between each part represent 50 yards of range.
- (c) The length of the parts of the horizontal zero and range lines, and the distance between the parts, represent the leads required for crossing targets. The length of each part and the distance between them represent increases in speed of 5 mph.



- (d) The zero line is marked "0" at each end. The four range lines are marked in hundreds of yards at each end.
- (e) For fifties of yards the position of the range line is judged in comparison with the lower end of the required part of the vertical line.
- (f) The point where the vertical and horizontal lines, which have been applied to the target, cross, covers the spot on the ground on which the rocket will explode if the range, speed and angle of direction of the target have been judged correctly.

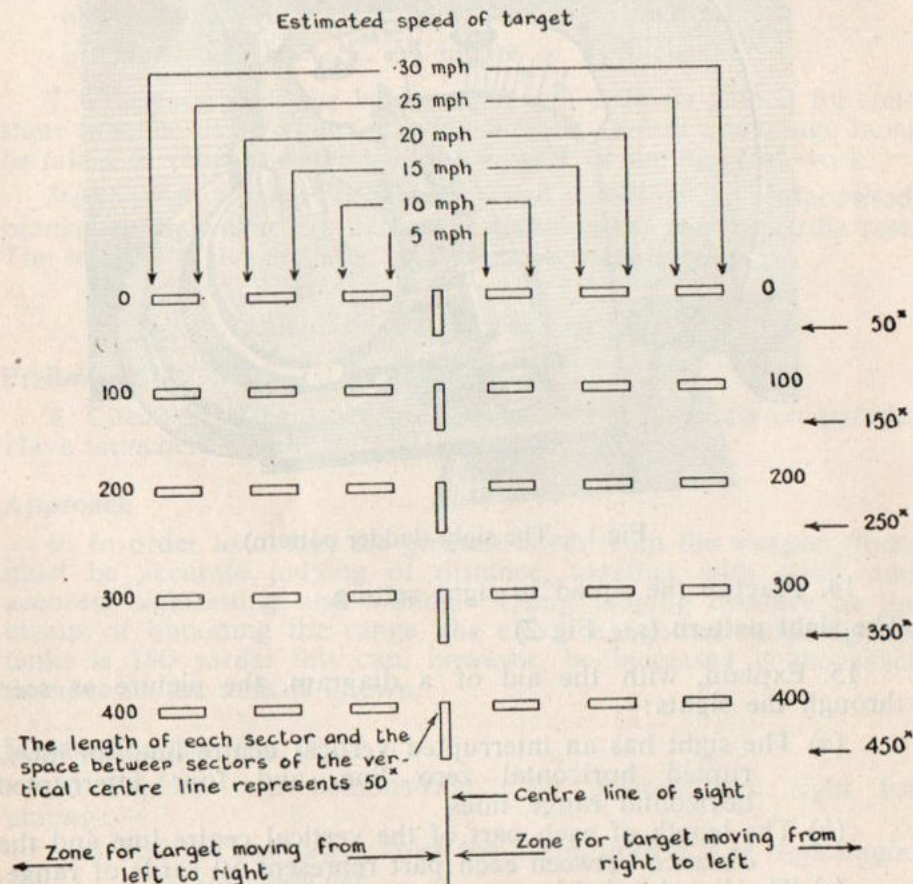


Fig 2.—The sight pattern (ladder pattern)

16. Question the squad and let them view the picture as seen through the sights.

### Aiming

17. *Stationary targets under 500 yards.*—Explain, using a diagram, how to aim (see Fig 3):—

- (a) Set the sight at "0 to 450".
- (b) Judge the range to the target, look through the sight and adjust the elevation of the launcher to bring that part of the vertical line which corresponds with the estimated range onto the centre of the target. At very close ranges a vulnerable spot on the target can be selected, such as the sides and rear of the engine compartment and the sides under the turret where the ammunition is stored. The least vulnerable parts are the sloping plate on the front, and the front of the turret (see Fig 21).

- (c) Keep the sight upright by checking with the horizontal line.

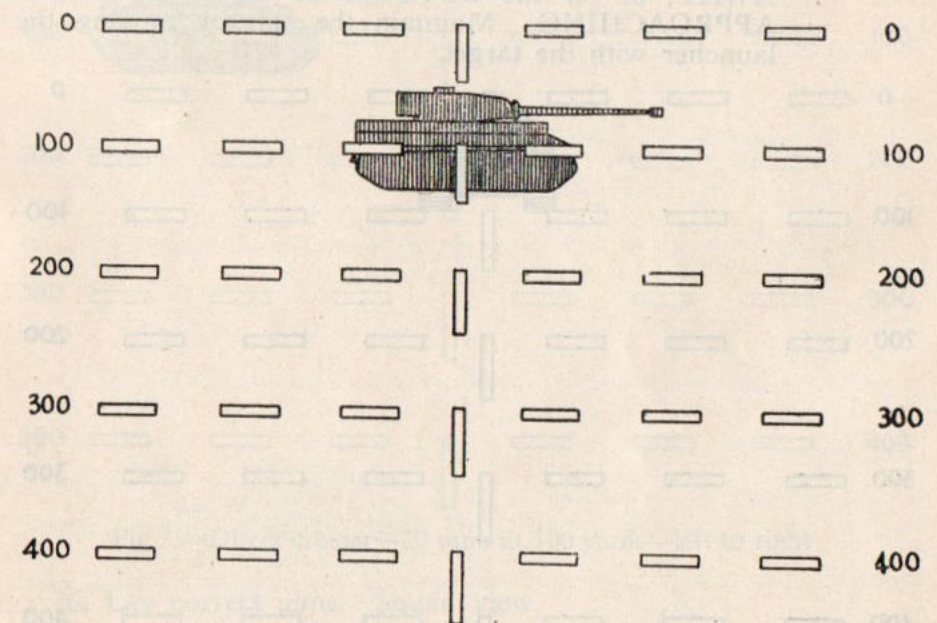


Fig 3.—Stationary target at 100 yards

18. *Stationary targets over 500 yards:*—

- (a) Judge the range and set the sight.
- (b) Look through the sight and adjust the elevation of the launcher to bring the TOP of the zero vertical line onto the centre of the target.
- (c) Keep the sight upright by checking with the horizontal line.



19. Lay correct aims. Squad view.

20. Explain and demonstrate how to use the launcher for aiming practice. Head rested in right hand, both elbows rested on the table, left hand works the monopod (if fitted).

21. Practise the squad in aiming at stationary targets below and over 500 yards.

### Moving targets

22. *Directly approaching or withdrawing targets.*—Explain, using a diagram (see Fig 4):—

(a) Judge the range, and if necessary set the sight to the range at which it is intended to open fire.

(b) Look through the sight and place the required part of the vertical line on the TOP of the target, if it is moving AWAY, or on the BOTTOM of the target if it is APPROACHING. Maintain the aim by moving the launcher with the target.

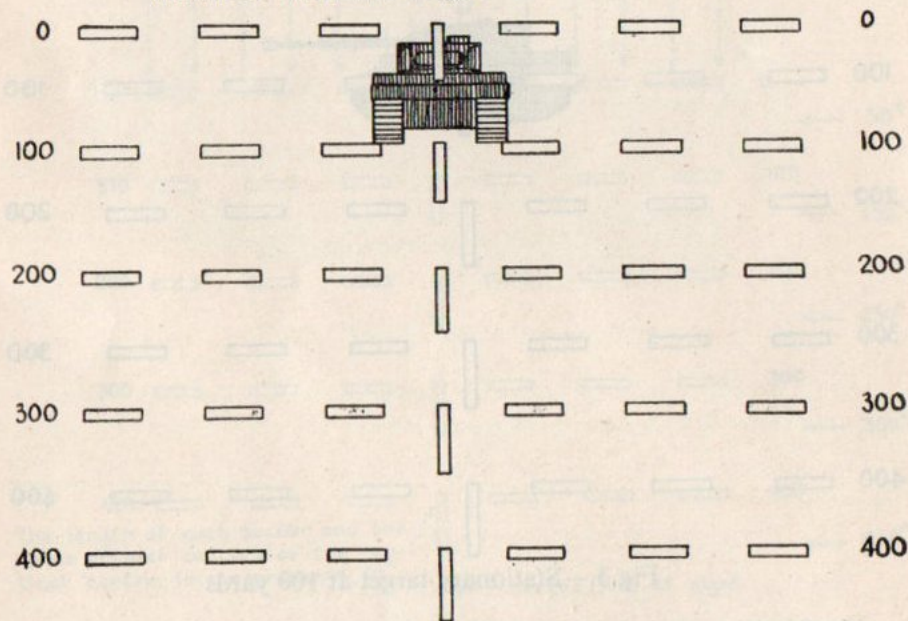


Fig 4.—Directly approaching at 100 yards

23. Lay correct aims. Squad view.

24. Practise the squad in laying aims at directly approaching and withdrawing targets.

25. *Directly crossing targets.* Explain, using diagrams (see Fig 5):—

(a) Judge the range and, if necessary, set the sight.

(b) Look through the sight and adjust the elevation of the launcher to bring the horizontal range line, which corresponds to the estimated range, onto the target.

(c) Judge the speed of the target in miles per hour and select the required lead on the horizontal range line. Place the selected aiming mark on the centre of the target.

(d) The vertical centre line must always be in front of the target.

(e) Maintain the aim by swinging the launcher with the target.

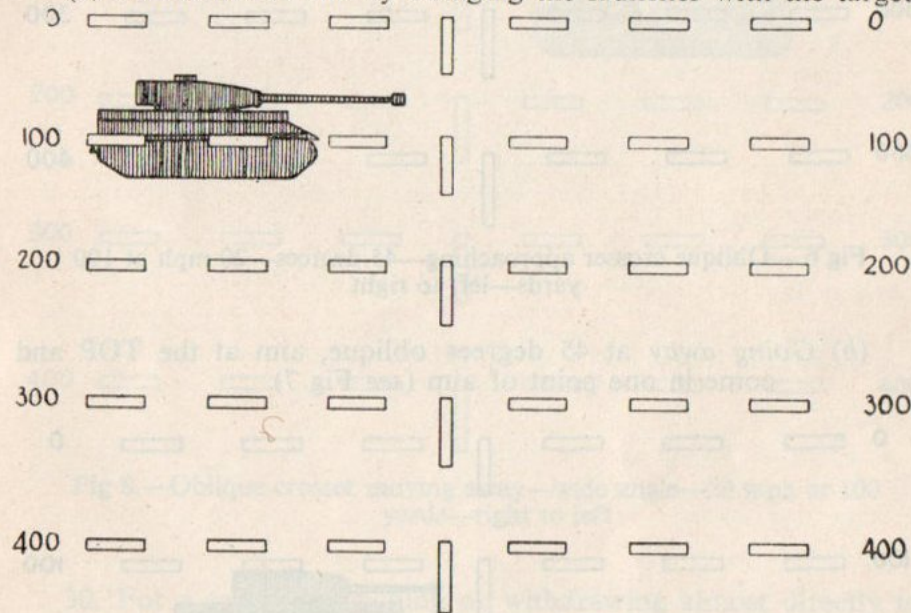


Fig 5.—Direct crosser—20 mph at 100 yards—left to right

26. Lay correct aims. Squad view.

27. Practise the squad in aiming at direct crossers, at all speeds up to 30 mph, travelling from right to left, and from left to right.

28. *Oblique crossing targets.*—Explain, using diagrams.—In all cases estimate speed and range. Set the sights to the range at which it is intended to open fire. If the tank is:—

(a) *Approaching* at 45 degrees oblique, aim at the BOTTOM and come in one point of aim (see Fig 6).



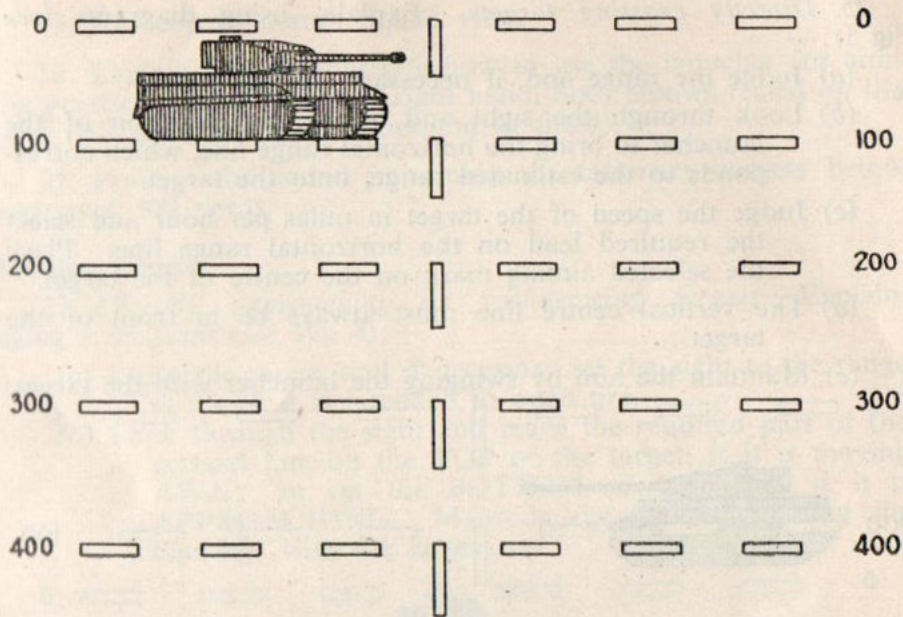


Fig 6.—Oblique crosser approaching—45 degrees—20 mph at 100 yards—left to right

(b) *Going away at 45 degrees oblique, aim at the TOP and come in one point of aim (see Fig 7).*

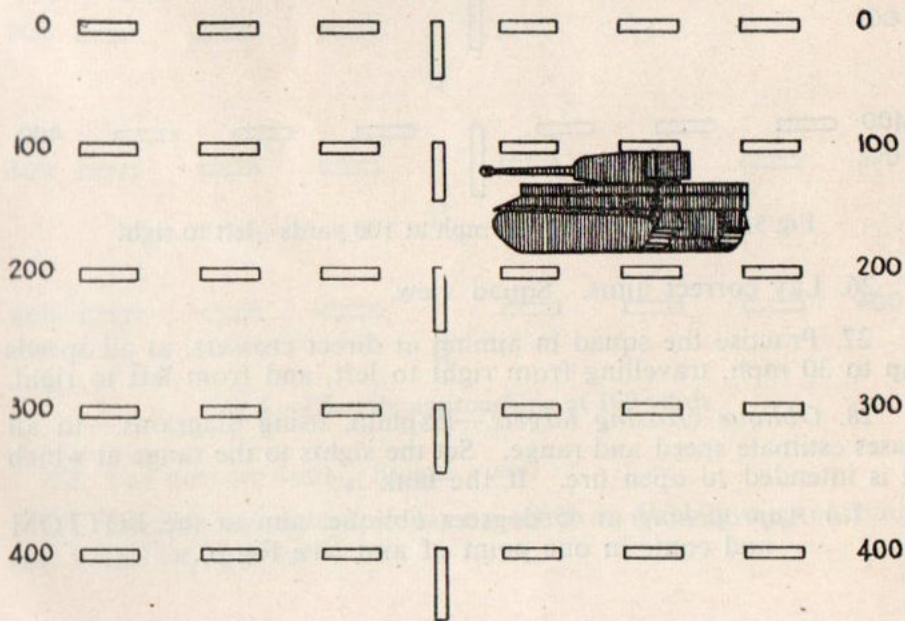


Fig 7.—Oblique crosser moving away—45 degrees—20 mph at 100 yards—right to left

29. For other angles the firer will judge the aim off in relation to the above, *eg*, for a tank crossing almost at right angles the aim will be virtually as for a direct crosser, except that the point of aim will be slightly above or below the centre of the tank, according to whether it is approaching or going away, and slightly less lead will be taken (*see* Fig 8).

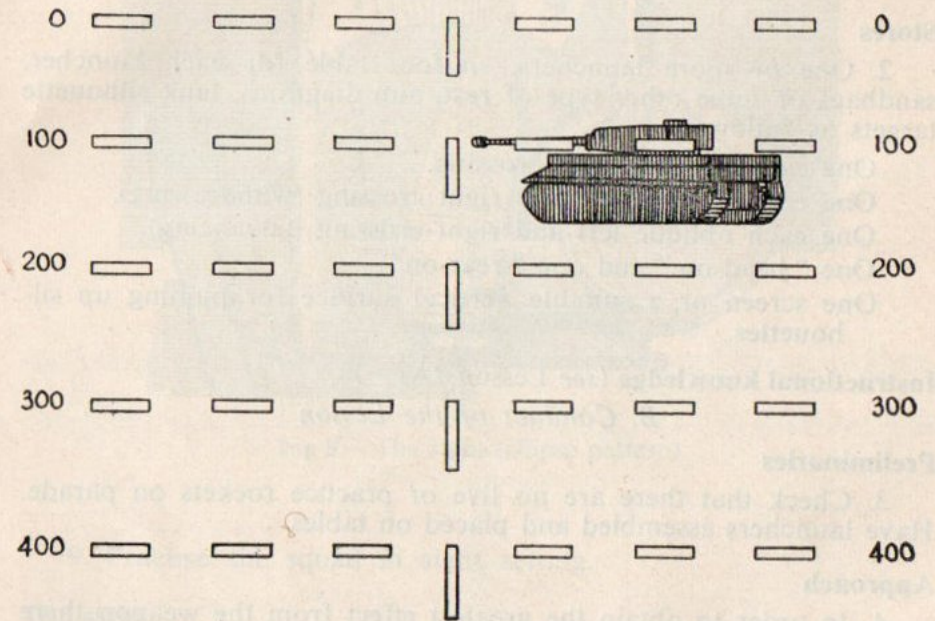


Fig 8.—Oblique crosser moving away—wide angle—20 mph at 100 yards—right to left

30. For a tank approaching or withdrawing almost directly towards or away from the firer, the aim will be almost the same as for a directly approaching or withdrawing tank. In all cases the aim must be maintained by moving the launcher with the target.

31. Lay correct aims. Squad view.
32. Practise the squad at oblique crossing targets.
33. Further practice at any moving vehicles.

#### Conclusion

34. Questions to and from the squad.
35. Sum up.



## LESSON 2B.—SIGHTSETTING AND AIMING—ELLIPSE PATTERN SIGHT

### A. Instructor's Notes

#### Aim

1. To teach sightsetting and aiming at stationary and moving targets.

#### Stores

2. One or more launchers, six-foot table for each launcher, sandbags or some other type of rest, aim diagrams, tank silhouette targets as follows:—

- One each left and right crossing.
- One each oblique left and right crossing (withdrawing).
- One each oblique left and right crossing (advancing).
- One "head-on" and one "rear-on".
- One screen or a suitable vertical surface for pinning up silhouettes.

#### Instructional knowledge (see Lesson 2A)

### B. Conduct of the Lesson

#### Preliminaries

3. Check that there are no live or practice rockets on parade. Have launchers assembled and placed on tables.

#### Approach

4. In order to obtain the greatest effect from the weapon there must be accurate judging of distance, together with quick and accurate sightsetting and aiming.

#### Sightsetting (see Fig 9)

5. Explain and demonstrate.—To position the sight for aiming:—

- (a) Pull the sight away from the barrel until it is at *right angles to the launcher*.
- (b) Raise the protective cap.

6. When not in use the protective cap will be lowered, and the sight folded back to the barrel; care must be taken not to damage the rubber eye piece.

7. *The range scale.*—The range scale is marked from 0 to 9; these figures indicate the range in hundreds of yards. In addition, the range scale is notched to indicate 50 yards of range. The indicator arm, which is moved by turning the sight, has a projection which fits into these notches, holds the sight in position when set, and assists in sightsetting.

8. To set the sights, turn the sight until the indicator arm points to the required range.

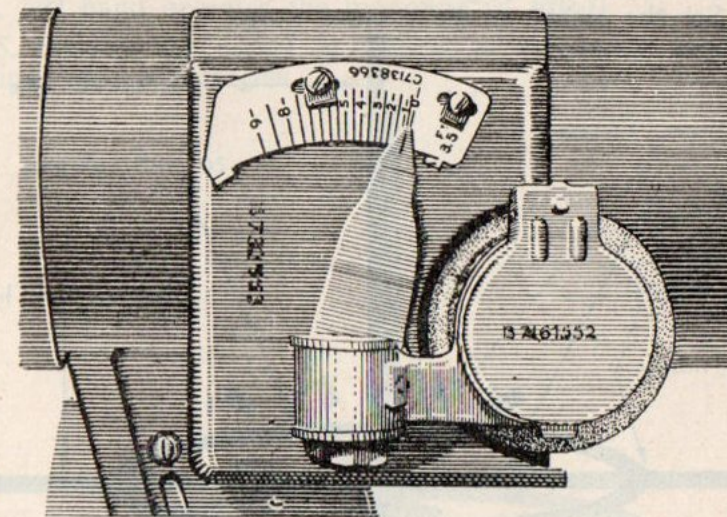


Fig 9.—The sight (ellipse pattern)

9. Practise the squad in sight setting.

#### The sight

10. Explain, with the aid of a diagram, the picture as seen through the sights (see Fig 10):—

- (a) The "open space" between the vertical and horizontal lines, which is used for aiming at stationary targets.
- (b) The two vertical marks on the horizontal line nearest to the open space, which are for aiming at ten mph crossing targets.
- (c) The complete ellipse for aiming at targets moving at 20 mph.
- (d) The eight marks above and below the 20 mph ellipse which, together with the two outside vertical marks on the horizontal line, form the outline of the 30 mph ellipse.

11. Squad view the picture as seen through the sights.



## Aiming

12. *Stationary targets.*—Explain, using a diagram, that to aim at stationary targets (see Fig 11):—

- Estimate the range.
- Set the sights to the correct range.

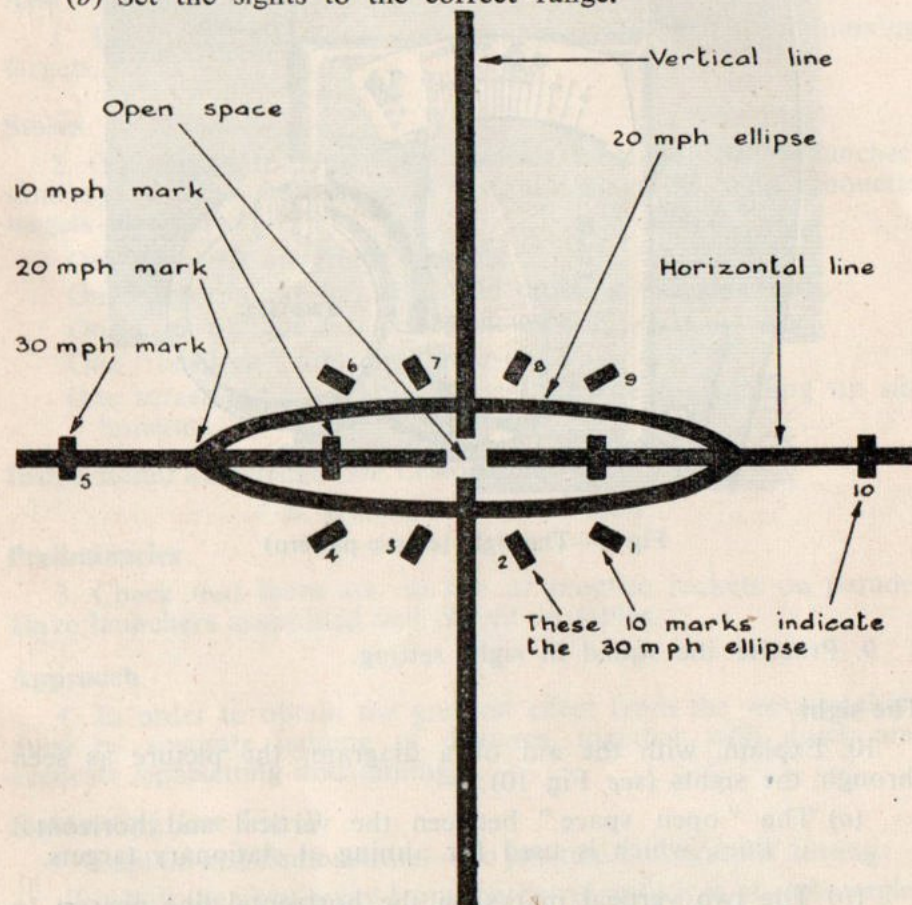


Fig 10.—The sight pattern (ellipse pattern)

(c) Place the centre of the "open space" on the centre of the target. If the range is short, pick out the most vulnerable part of the target and place it in the centre of the "open space". The parts of a tank which are most vulnerable to the rocket are (see Fig 21):—

- The sides and rear of the engine compartment.
- The sides under the turret where ammunition is stored.

The least vulnerable parts are the sloping plate (the glacis plate) on the front, and the front of the turret.

(d) Keep the sights upright by noting the position of the horizontal line.

13. Lay a correct aim. Squad view.

14. Explain and demonstrate how to use the launcher for aiming practice. Head rested in right hand, both elbows rested on the table, left hand operates the monopod (if fitted).

15. Practise the squad in aiming at stationary head-on and crossing silhouette targets.

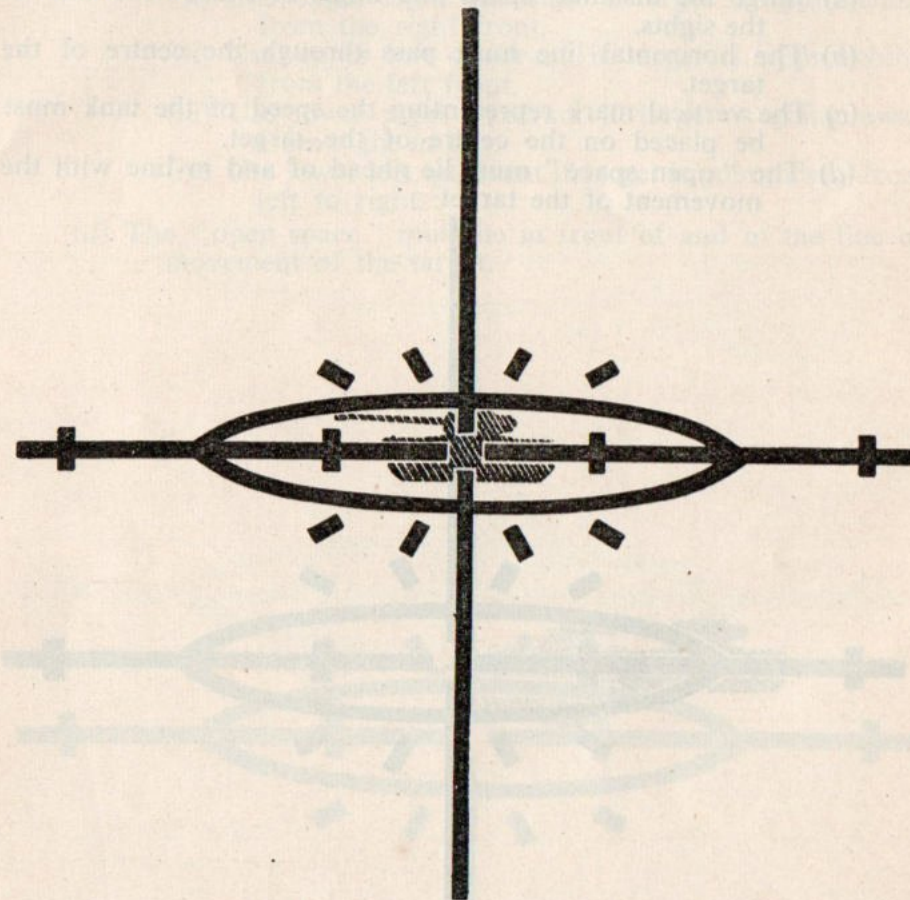


Fig 11.—Correct aim—stationary tank

## Moving targets

16. *Directly approaching and withdrawing, ellipse pattern.* Explain, using a diagram:—

- Judge the distance and speed.
- The vertical line must pass through the centre of the target.
- The "open space" must lie ahead of and in line with the movement of the target.
- The amount of lead depends upon the speed of the target.



17. Demonstrate correct aims for directly approaching and withdrawing tanks at 20 mph.

18. Practise squad in laying aims for directly approaching and withdrawing tanks at 10, 20 and 30 mph.

19. *Direct crossers, ellipse pattern.* Explain, using a diagram (see Fig 12):—

- (a) Judge the distance, speed and angle of movement and set the sights.
- (b) The horizontal line must pass through the centre of the target.
- (c) The vertical mark representing the speed of the tank must be placed on the centre of the target.
- (d) The "open space" must lie ahead of and in line with the movement of the target.

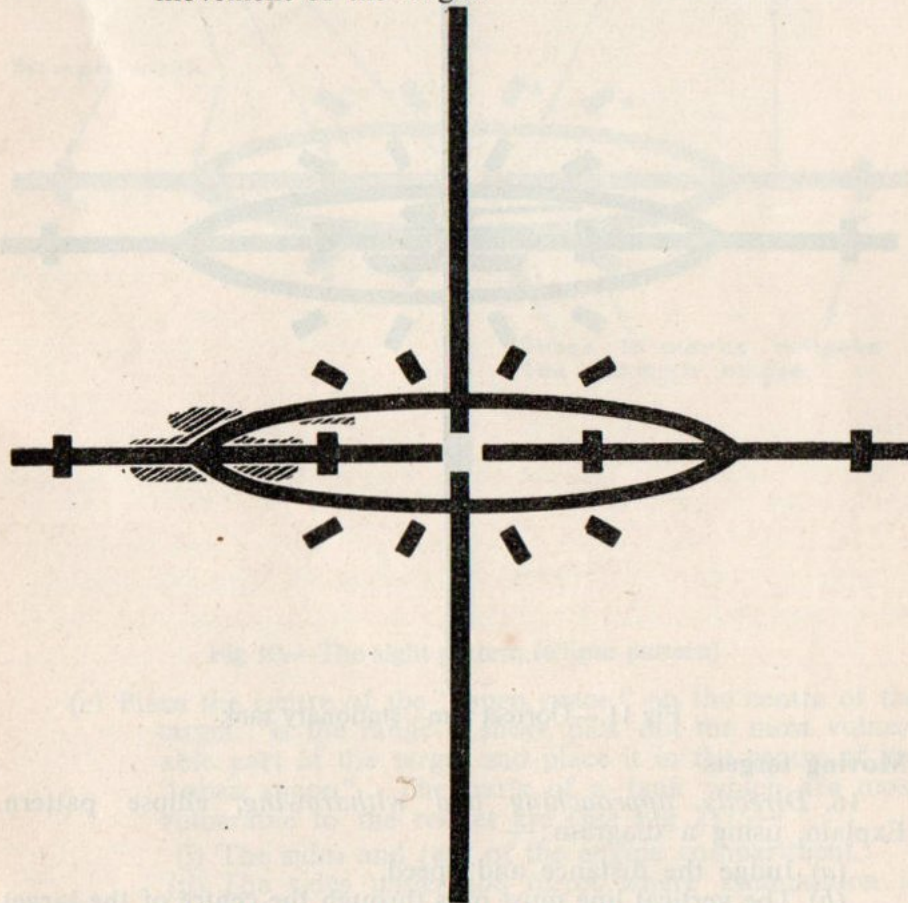


Fig 12.—Correct aim—crossing tank—20 mph

20. Demonstrate correct aim at direct crossers at 20 mph.

21. Practise squad in laying aims at direct crossers at 10, 20 and 30 mph.

22. *Oblique crossers at 45 degrees.* Explain, using diagrams (see Fig 13):—

- (a) Judge the distance, speed and angle of movement and set the sights.
- (b) The target must be on the proper speed ellipse.
- (c) It must be placed in the proper quadrant:—
  - (i) Use upper right quadrant if target is approaching from the right front.
  - (ii) Use upper left quadrant if target is approaching from the left front.
  - (iii) Use lower right quadrant if target is going away from right to left.
  - (iv) Use lower left quadrant if target is going away from left to right.
- (d) The "open space" must be in front of and in the line of movement of the target.

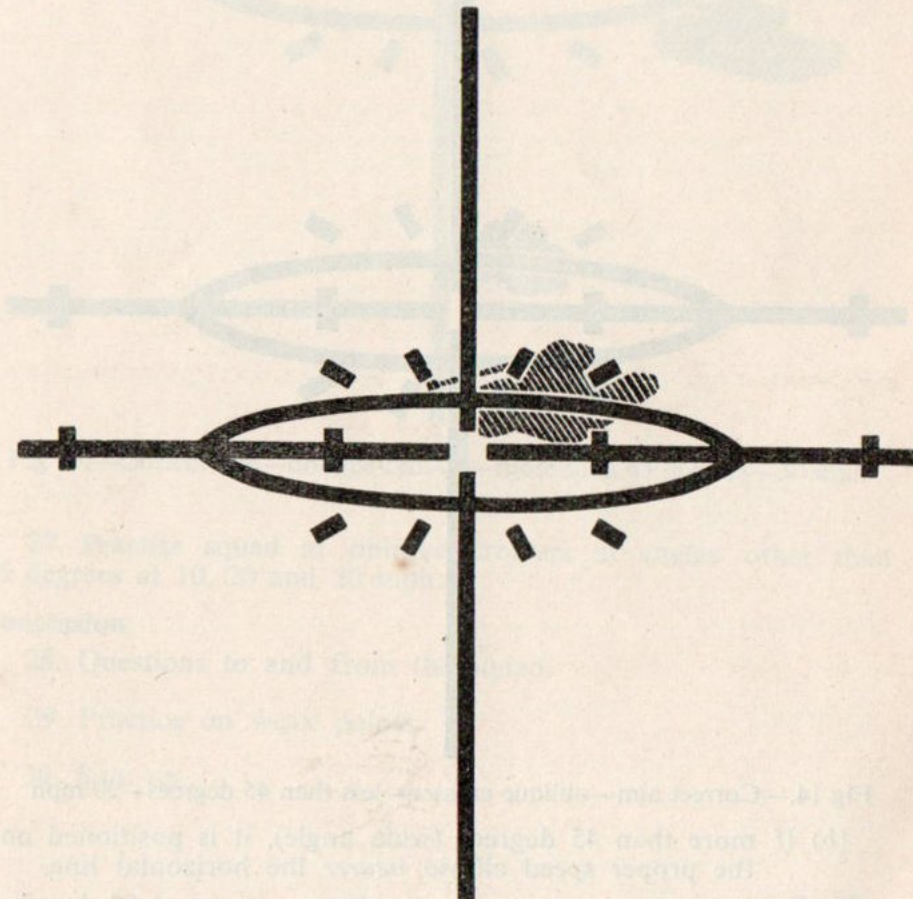


Fig 13.—Correct aim—oblique crosser—45 degrees—20 mph



23. Demonstrate correct aim at 45 degrees oblique crossers at 20 mph.

24. Practise squad in aiming at 45 degrees oblique crossers at 10, 20 and 30 mph.

25. *Oblique crossers at angles other than 45 degrees.* Explain, using diagrams (see Figs 14 and 15).—The method of aiming is the same as for 45 degrees crossers, except that:—

- (a) If the target is approaching or moving away at less than 45 degrees (narrow angle), it is positioned on the proper speed ellipse *nearer* the vertical line.

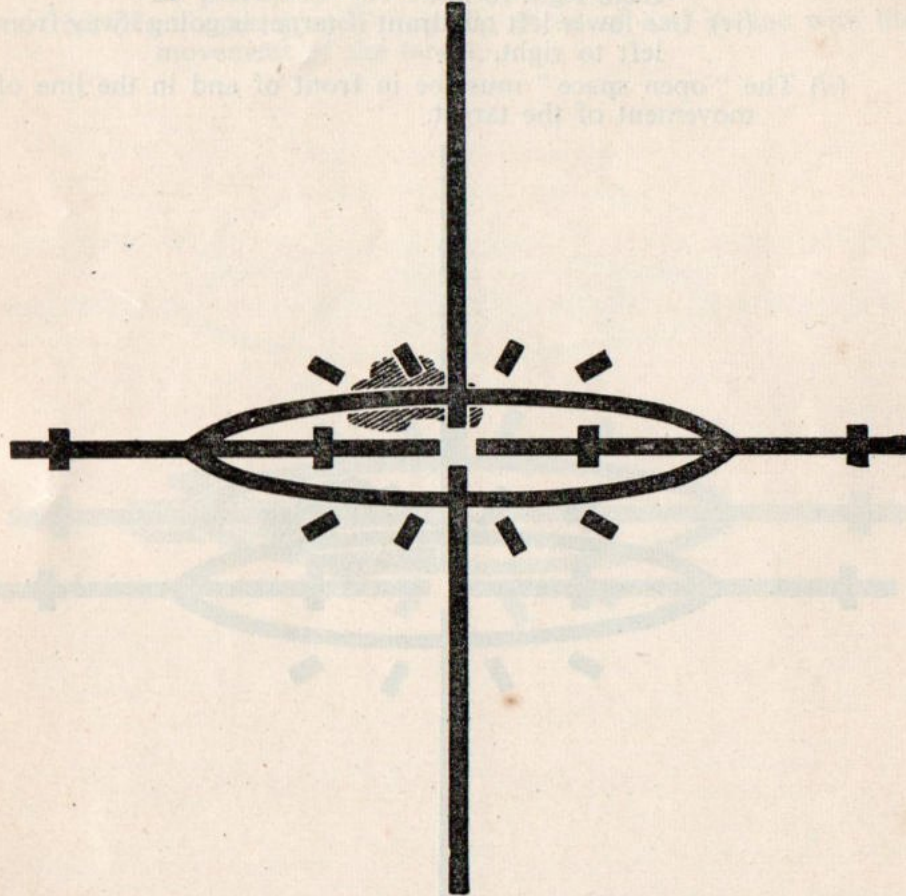


Fig 14.—Correct aim—oblique crosser—less than 45 degrees—20 mph

- (b) If more than 45 degrees (wide angle), it is positioned on the proper speed ellipse *nearer* the horizontal line.

26. Demonstrate a correct aim at oblique crossers at 60 degrees at 20 mph.

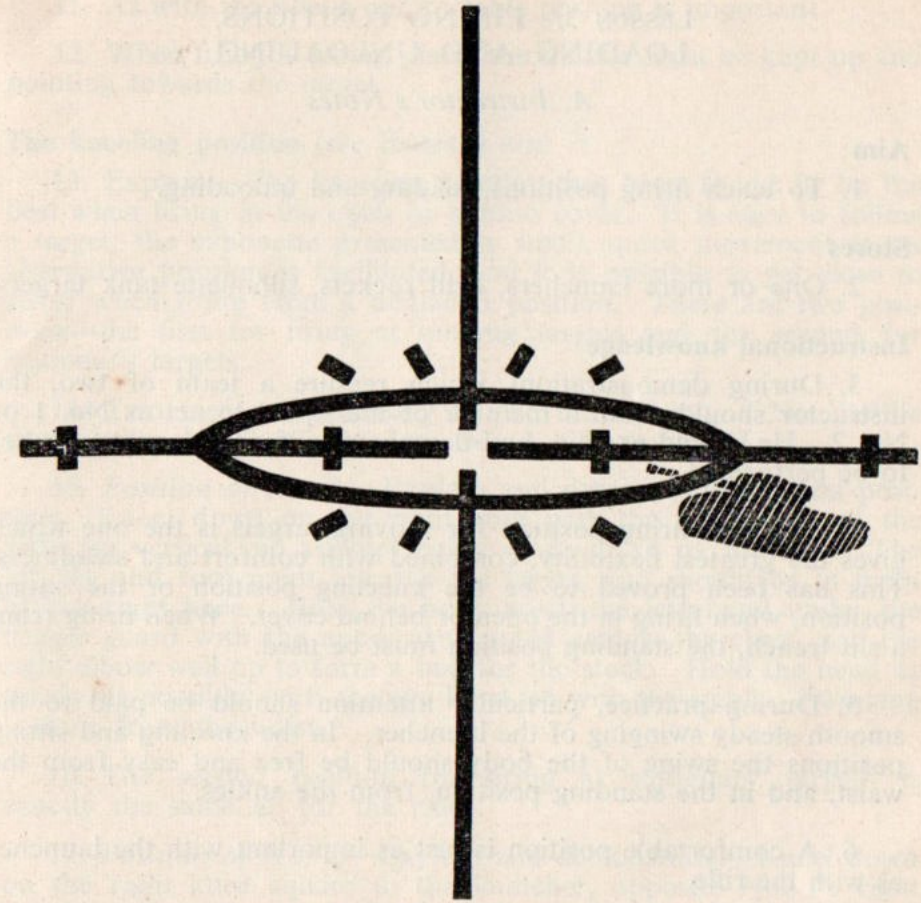


Fig 15.—Correct aim—oblique crosser—more than 45 degrees—30 mph

27. Practise squad at oblique crossers at angles other than 45 degrees at 10, 20 and 30 mph.

#### Conclusion

28. Questions to and from the squad.
29. Practice on weak points.
30. Sum up.



### LESSON 3.—FIRING POSITIONS, LOADING AND UNLOADING

#### A. Instructor's Notes

##### Aim

1. To teach firing positions, loading and unloading.

##### Stores

2. One or more launchers, drill rockets, silhouette tank targets.

##### Instructional knowledge

3. During demonstrations which require a team of two, the instructor should detail a member of the squad to act as No. 1 or No. 2. He should explain, and demonstrate if necessary, the duties to be performed.

4. The best firing position for moving targets is the one which gives the greatest flexibility, combined with comfort and steadiness. This has been proved to be the kneeling position or the sitting position, when firing in the open or behind cover. When firing from a slit trench, the standing position must be used.

5. During practice, particular attention should be paid to the smooth steady swinging of the launcher. In the kneeling and sitting positions the swing of the body should be free and easy from the waist, and in the standing position, from the ankles.

6. A comfortable position is just as important with the launcher as with the rifle.

7. DO NOT ALLOW ANYONE TO STAND BEHIND THE LAUNCHER WHEN IT IS LOADED.

#### B. Conduct of the Lesson

##### Preliminaries

8. Normal safety precautions.

##### Revision

9. Question the squad on aiming.

##### Approach

10. The launcher can be fired from any of the normal rifle firing positions. Combined with quick and accurate aiming, there must be quick and accurate taking up of the best position and loading.

11. As with the rifle, a comfortable position is important.

12. When firing is taking place, the muzzle must be kept up and pointing towards the target.

##### The kneeling position (see Plates 6 and 7)

13. Explain.—The kneeling position has been found to be the best when firing in the open or behind cover. It is easy to follow a target, the silhouette presented is small, quick movement to an alternative position is facilitated, and it is possible to get close to cover when firing from a defiladed position. There are two positions—the first for firing at moving targets and the second for stationary targets.

14. Two men are necessary to fire the weapon, a No. 1—the firer—and a No. 2—the loader. No. 1 is in command.

15. *Position of No. 1.*—Explain and demonstrate the first position. Kneel down on the right knee with the upper part of the right leg vertical, no attempt being made to sit on the heel. The left leg and foot point towards the target, and should be in front of the right knee. Hold the body erect, the left hand under the trigger guard with the upper arm rested against the chest, and the right elbow well up to form a bed for the stock. Hold the head as steady as possible, with the eye lined up with the sights. Swinging is done from the waist.

16. The second position for firing at stationary targets is exactly the same as for the rifle.

17. *Position of No. 2.*—Explain and demonstrate. Kneel down on the right knee square to the launcher, opposite No. 1's right shoulder, close enough to the launcher to be able to load it, communicate with No. 1, and assist in observation of fire. The No. 2 must move about to conform to the movements of the No. 1.

18. Should the No. 1 adopt the second kneeling position, the No. 2 will probably find it better to kneel on both knees.

19. Practise the squad in both positions.

##### Loading

20. *Duties of No. 1.*—Explain—When the No. 1 decides to load, or is given the order "Load", he will place the safety switch at "SAFE", tap No. 2 on the shoulder and order "Load". He then places his right hand over the top of the launcher, well forward of the pistol grip, in order to control it and keep the launcher pointing at the target while it is being loaded. This precaution is also necessary to avoid any chance of the trigger being pressed during the loading operation.



21. *Duties of No. 2.*—Explain and demonstrate:—

- (a) The No. 2 will repeat the order "Load". He will then take up a rocket, with his left hand underneath, keeping the rocket head pointing towards the target.
- (b) With the right hand he will remove the long contact wire, by pulling it straight back from the fin assembly, and the shorting clip from the contact ring. He will retain the shorting clip until the rocket has been fired.
- (c) Pressing the contactor latch with the right hand, he will slide the HEAD of the rocket into the launcher. He will release the contactor latch in order to engage the aluminium contact band. This will hold the rocket firmly and correctly positioned in the launcher.
- (d) Using both hands, he will then remove the safety band, and retain it (*see Plate 8*). *If, when the safety band is removed, the ejection pin is ejected, the rocket is in an extremely dangerous and sensitive condition. It must be carefully withdrawn, and held vertically with the nose upwards. It must never be laid flat on the ground but placed vertically, nose upwards, either in a trench or against a bank, and destroyed immediately.*
- (e) Pressing down the contactor latch with the right hand he will push the rocket into the launcher until the contactor latch, when released, engages in the contact ring on the fin assembly.
- (f) He will then remove about  $\frac{1}{2}$  inch of insulating tubing from the long contact wire and retain it, and put the bare part of the wire through either of the contact springs (*see Plate 9*). The wire must not be wound round the spring. No part of the bare wire must touch any other part of the launcher.
- (g) No. 2 will then tap No. 1 and call "Up".

No. 1 will then return his right hand to the pistol grip. The loaded launcher MUST NOT be jarred. Any jarring may unlock the rocket from the contactor latch and allow it to slip out of the launcher (*see para 23 (c)*).

**Unloading**

22. *Actions of No. 1.*—Explain.—If No. 1 has made no attempt to fire he will put the safety switch to "Safe", tap No. 2 and call "Trigger not pressed—Unload", placing his right hand over the barrel.

23. *Actions of No. 2.*—Explain and demonstrate:—

- (a) Repeat "Unload" and release the long contact wire from the contact spring.

- (b) Press contactor latch with right hand and remove the rocket from the launcher far enough to be able to replace the safety band. Release the contactor latch.
- (c) Replace the  $\frac{1}{2}$ -inch insulating tube on the long contact wire and place the latter in the fin assembly, replace the shorting clip and call "Up".

24. No. 1 returns hand to pistol grip.

25. Practise squad in loading and unloading.

**Sitting positions** (*see Plates 10 and 11*)

26. *Explain.*—There are two sitting positions; the first can be used when firing at moving targets and the second at stationary targets.

27. *Position of No. 1.*—Explain and demonstrate.—Sit down facing half right to the target and cross the legs, lean the body slightly forward from the hips and keep the back straight.

28. Keep both elbows off the knees, place the left elbow underneath the launcher and force the upper part of the left arm against the chest. Keep the right elbow well up.

29. Hold launcher with the left hand on the trigger guard and the right hand on the pistol grip.

30. The eye is lined up with the sights, and swinging is done from the waist.

31. The second position is basically the same as the first except that the feet are apart and the heels dug in; both elbows are rested on the knees.

32. *Position of No. 2.*—Explain and demonstrate.—Sit or kneel on both knees opposite No. 1's right shoulder, close enough to be able to communicate with No. 1, to load and to assist in observation of fire. The No. 2 must conform to the movements of the No. 1.

33. Practise the squad in the sitting position.

**The standing position** (*see Plate 12*)

34. *Explain.*—The standing position may be used on service, when firing from high cover or when taking a quick shot in the open. In defence the standing position will normally be used, firing from a fire trench or emplacement modified to take the No. 1 and No. 2, the launcher, rockets and one rifle or sten.

35. *Position of No. 1.*—Explain and demonstrate.—Stand half right to the target, body evenly balanced on both feet, which should be about one or two feet apart. Hold the launcher as in the first kneeling position.



36. *Position of No. 2.*—Explain and demonstrate.—Stand facing square to the launcher opposite No. 1's right shoulder, close enough to communicate with No. 1, to load and to assist in observation of fire. No. 2 must conform to the movements of No. 1.

37. Practise the squad in the standing position.

### The lying position

38. Explain.—It is difficult to engage moving targets at close range, or any target more than 300 yards away, from the lying position. It will therefore be adopted only when no other position is practicable.

39. *Position of No. 1.*—Explain and demonstrate.—Lie down with the body and legs as nearly as possible at right angles to the launcher, with both heels flat on the ground. It is important that no part of the body or legs is behind the launcher.

40. The right arm is through the sling, behind the stock, and the right hand grasps the pistol grip. The left hand holds the trigger guard. The eye is lined up with the sight.

41. *Position of No. 2.*—Explain and demonstrate.—Lie down at right angles to the launcher, on the opposite side to No. 1. The head must be opposite No. 1's right shoulder, near enough to the launcher for No. 2 to be able to communicate with No. 1, to load, and to assist in observation of fire. He must conform to the movements of No. 1. No part of his body or legs must be behind the launcher.

42. Practise the squad in the lying position.

43. Explain.—Loading and unloading in the sitting, standing and lying positions are exactly the same as already taught.

44. Practise the squad in loading and unloading in all positions.

### Conclusion

45. Questions to and from the squad.

46. Practice on weak points.

47. Sum up.

## LESSON 4.—FIRING AND ACTION ON MISFIRE

### A. Instructor's Notes

#### Aim

1. To teach trigger operation, firing, and actions on a misfire.

#### Stores

2. One or more launchers, drill rockets, silhouette tank targets at ten yards.

### Instructional knowledge

3. With the earlier models the magneto will function when the trigger is released.

4. During demonstrations which require a team of two, the instructor should detail a member of the squad to act as No. 1 or No. 2. He should explain and demonstrate, if necessary, the actions to be performed. **DO NOT ALLOW ANYONE TO STAND BEHIND THE LAUNCHER WHEN IT IS LOADED.**

### B. Conduct of the Lesson

#### Preliminaries

5. Inspect all rockets to make certain that there are no live or practice rockets on parade. Have launchers assembled for firing.

#### Revision

6. Loading and unloading in any position. Last pair leave launcher loaded.

#### Approach

7. Combined with quick and accurate aiming and loading, there must be quick and accurate firing. No. 1 and No. 2 must work as a team in order to get the greatest value from the launcher and the maximum number of "kills".

#### Trigger operation

8. Explain, and demonstrate where possible.—The pistol grip contains a small magneto. When the trigger is operated (when operated and released in earlier models) the magneto generates electricity which travels *via*:—

- (a) The insulated wire inside the metal tubing on the outside of the launcher to the contact springs.
- (b) Along the long contact wire of the rocket to an electric igniter inside the motor.

9. To complete the circuit, the current then travels:—

- (a) Through the short contact wire to the aluminium band round the fins.
- (b) Through the contactor latch and the barrel and back to the pistol grip.

10. The safety switch when put to "SAFE" prevents movement of the trigger by means of a safety block fitted to the inside of the switch. On earlier models which have the safety switch on the rear of the pistol grip, the placing of the safety switch to "SAFE" short-circuits the current and the rocket cannot be fired.

11. Question the squad.



## Firing

12. Explain and demonstrate in the kneeling position.—After the rocket has been loaded, No. 1 checks the range setting, puts the safety switch to "FIRE", aims, and operates the trigger by a squeezing action of the first two fingers, which are placed around the trigger. As with the rifle, the breathing should be restrained while aiming and operating the trigger.

13. The correct sight picture should be kept, until the rocket leaves the barrel, otherwise the tendency is to drop the barrel, in which case the rocket is likely to strike the ground just in front of the launcher and explode.

14. No. 1 and No. 2 should watch the strike of the rocket. After the rocket has struck, No. 1 calls "Load".

15. No. 2 loads another rocket when ordered.

16. The rate of fire is from one to three rockets per minute.

17. Explain that during practice, as the rocket does not leave the barrel, No. 2 will go through the correct motions of loading.

18. Practise the squad in firing, in all positions, at stationary and any handy moving targets.

## Immediate action on misfire

19. Explain and demonstrate that, should the rocket fail to fire, the following immediate action will be carried out.

20. *Actions of No. 1:—*

(a) Maintain the sight picture and release the trigger. This action will cater for:—

(i) A possible "hang fire".

(ii) The possibility that an earlier model launcher may be in use, in which case current will be generated when the trigger is released and the rocket may fire.

(b) If the rocket does not fire, check that the safety switch is in the "FIRE" position. If it is not, quickly set it to "FIRE" and, if the target is still in view, aim and fire.

(c) If, on inspection, the safety switch is in the "FIRE" position, or if the safety switch has been moved to "FIRE" but the rocket still does not fire, retain sight picture, release trigger, place the safety switch to "SAFE", remove right hand from pistol grip, tap No. 2, and call "Misfire", and place the right hand over the top of the launcher.

21. The launcher will be kept pointing in the general direction of the enemy, or target area, until the rocket is fired or unloading is completed.

22. *Actions of No. 2.*—On completion of the above actions by No. 1, culminating in his order "Misfire", No. 2 will:—

(a) Repeat "Misfire", and count slowly up to 15 to allow for a possible "hangfire".

(b) See whether the bare part of the long contact wire is touching any part of the launcher except the contact spring.

(c) If the contact wire is touching the launcher, put it in the correct position, tap No. 1, and call "Up".

(d) If the contact wire is in the correct position, remove it from the contact spring, press down contactor latch, and rotate the rocket half a turn.

(e) Release contactor latch and replace the long contact wire on the contact spring.

(f) Tap No. 1 and call "Up".

23. *Actions of No. 1:—*

(a) On the command "Up" from No. 2, move safety switch to "FIRE", aim and fire.

(b) If still a misfire, retain sight picture, release trigger, put safety switch to "SAFE", remove right hand from pistol grip, tap No. 2 and call "Misfire—Unload"; place right hand over the top of the launcher.

24. *Actions of No. 2:—*

(a) Repeat the order "Misfire—Unload", and count slowly up to 15.

(b) Unload the rocket, replace the safety band; the shorting clip is not replaced.

(c) Place rocket aside, load with a fresh rocket, and call "Up".

25. *Actions of No. 1.*—Replace hand on pistol grip, move safety switch to "FIRE", aim and fire.

26. Explain.—The actions as taught are necessary for absolute safety when firing on ranges under peace-time conditions. In action, No. 1 must decide whether any of these precautions may be omitted. He will be guided by the range to the enemy tank, and the urgency of the situation.

27. Practise the squad in firing and actions on misfire.



28. Explain.—In addition to misfires occurring, No. 2 may find it impossible to load the launcher. Experience has shown that the possible causes and remedies may be as follows:—

- (a) *Bent barrel*.—Replace the launcher.
- (b) *Bent breech guard*.—Straighten the breech guard with pliers.
- (c) *Oversized or bent rocket*.—Discard and load with a new rocket.
- (d) *Bent or defective contactor latch*.—Attempt to straighten the latch. When contact cannot be made replace the latch. The forward end of the latch **MUST NOT** be wedged up.

29. Question the squad.

### Conclusion

- 30. Questions to and from the squad.
- 31. Practice on weak points.
- 32. Sum up.

## LESSON 5.—HANDLING

### A. Instructor's Notes

#### Aim

1. To practise launcher teams in the handling of the launcher in the field in order to obtain correct battle technique.

#### Stores

2. One launcher, four drill rockets, face veils, moving tank targets or trucks representing tank targets, battle order.

#### Instructional knowledge

3. Paras 7 to 11 can be given in the form of a short lecture, with suitable examples, by platoon commanders, etc, the practical part of the lesson being taken by NCOs.

4. The ground to be used must be carefully chosen. It should be a likely defensive position containing:—

- (a) Likely lines of tank approach.
- (b) Likely launcher positions which cover the following points:—
  - (i) Good concealment from air and ground.
  - (ii) Some defilade from the front.
  - (iii) Easy to get away to alternative positions.
  - (iv) Good field of fire.

5. The lesson should be frequently practised on different types of ground, and will require at least two 40-minute periods.

## B. Conduct of the Lesson

### Preliminaries

6. Inspect rockets to make sure that there are no live or practice rockets on parade. Inspect and check stores and equipment.

### Approach

7. Technical knowledge and handling of the launcher are only the preliminary work. To be efficient in battle the launcher team must be practised in battle handling so that they work together as a team, and acquire a battle technique which will ensure "one rocket, one tank".

### Target priorities

8. Explain.—The primary role of the launcher is to kill tanks. The power of the HE AT rocket is used to the full in this role. This primary role, owing to the small number of rockets carried, must always be given priority.

9. In its secondary role the launcher can be used against heavy weapons and artillery, stone, concrete and log fortifications, buildings and emplacements, and grouped personnel.

10. It will sometimes be possible to engage groups of men with good effect, both physical and moral.

### Siting and choosing of fire positions, anti-tank

11. Explain.—In addition to normal fieldcraft training, the following points must be considered when siting fire positions in defence:—

- (a) The position chosen must be capable of giving cover, concealment and freedom of traverse.
- (b) Owing to the distinctive flash from the rear of the launcher, it may be necessary for the team to move to alternative positions after firing one or more rockets.
- (c) The enemy will be on the look-out for launchers, and the weapon must be concealed both in the approach to the position and in the position itself.
- (d) As tanks are most vulnerable on the sides, the best position will be one which is defiladed from the front, the launcher firing across the line of advance of the tank.
- (e) Consideration must be given to the back-blast from the launcher. No. 2 must always be on the alert to prevent injury to himself, No. 1 and other friendly troops. In dry and dusty climates the area of the back-blast must be carefully watered or matted to prevent excessive dust or grass fires. *There must always be a clear space behind the rear of the launcher, especially when it is fired from a fire trench.* Particular care must be taken to ensure that no rockets or ammunition of any kind are in the danger area of the back blast.



- (f) The field of fire will depend upon the ground, but in general the shorter the range, the more certain the kill. In its primary role, therefore, a maximum field of fire of 200 yards and a minimum of 100 yards is sufficient. All tanks, moving or stationary, should be killed up to 150 yards. Kills can be obtained at longer ranges, when accurate means of obtaining the range are available.
- (g) In order to obtain surprise, the launcher team must remain concealed and quiet as long as possible.
- (h) Correct estimation of range is vital. The general tendency is to under-estimate the range. If possible, as in prepared defensive positions, certain landmarks within the arc should be fixed by pacing. During darkness, effective fire can be obtained, at close range, by firing at the sound of a tank or the flash of its gun.
- (j) The launcher can be used for street fighting, and can be fired from buildings, but great care must be taken that the back blast does not endanger our troops. The back-blast can easily blow a hole through a plaster wall, thus endangering our own troops who may be in other rooms of the house.
- (k) Launchers should be mutually supporting and, in defence, will be sited in depth throughout the position. Where possible, their arcs of fire should overlap, covering all likely tank approaches.
- (l) In defence, all available rockets will be dumped with the launcher, in the launcher position.

## 12. Question the squad.

### The launcher team

13. Explain and demonstrate, using members of the squad.—The launcher team consists of:—

No. 1.—The commander and firer.

No. 2.—The loader and assistant.

Nos. 3 and 4.—Ammunition carriers.

14. Nos. 1 and 2 are the permanent launcher team; Nos. 3 and 4 will be detailed from the platoon to which the launcher is allotted, and will accompany the team when necessary in the advance or attack.

15. The team is normally equipped as follows:—

- No. 1 .. .. Launcher, camouflage net made up of face veils.
- No. 2 .. .. Rifle and bayonet, 50 rounds SAA or Sten and five filled magazines and two rockets.
- Nos. 3 and 4 .. Rifle and bayonet, 50 rounds SAA and two rockets each.

16. Practise and question the squad in equipping themselves as launcher teams.

### Methods of carriage

17. Explain.—The method of carriage when not in touch with the enemy is by the sling over either shoulder with the barrels clamped side by side. When action is imminent the launcher must be carried assembled ready for firing. If under observation it should be carried in such a manner as to make it look as little like a launcher as possible. The worst way would be to carry it over the shoulder. A good way would be to hold it by the pistol grip with the launcher up and down the side and covered by a suitable arrangement of face veils.

18. Practise the squad.

### Methods of crawling

19. Explain.—Crawling may be necessary when occupying an exposed position. The methods of crawling as taught with the LMG can be adapted to crawling with the launcher.

20. Explain and demonstrate the side crawl.—Lie on the right side with the rear of the launcher resting on the right leg or foot, the front supported by the right hand, pistol grip upwards or to the right.

21. Practise the squad in this and other crawls singly and in pairs.

### Handling in a launcher emplacement

22. The launcher can be fired, in an emergency, from the normal two-man fire trench (see Infantry Training, Volume IV, Infantry Section Leading and Platoon Tactics, Appendix B). When time permits, the fire trench should be widened by one foot and deepened at either end by holes two feet square and two feet deep. This leaves a firing platform in the centre, and sufficient room to enable Nos. 1 and 2, and their weapons and equipment, to obtain protection from the crushing action of tanks passing overhead.



24. Practise the squad.

25. Take the squad over a suitable piece of ground that has three launcher positions covering an arc in which are likely tank approaches. At least one of the positions should be defiladed from the front, and one dug and fully developed.

27. Allow time for reconnaissance, then practise the squad in teams.

28. If moving targets such as trucks are available, get them to move towards the position.

29. Discuss each team's performance under the following headings :—

- (a) According to the orders received, the approach and occupation of the position.
- (b) The alternative positions.
- (c) The team work.
- (d) Points of elementary fieldcraft and launcher training.

30. Further practice on fresh ground as time and ground permit.

### 31. Questions to and from the squad.

32. Sum up lessons learnt.

### A. Instructor's Notes

1. To teach the methods of zeroing the launcher.

2. A solid rest to support the launcher (filled sandbags will do), front and rear bore sights, screwdriver, spanner, testing target, plumb line, tape measure or ruler.

3. *Testing target* (see Fig 16).—For the testing target method of zeroing, a target as described in Fig 16 must be made locally.

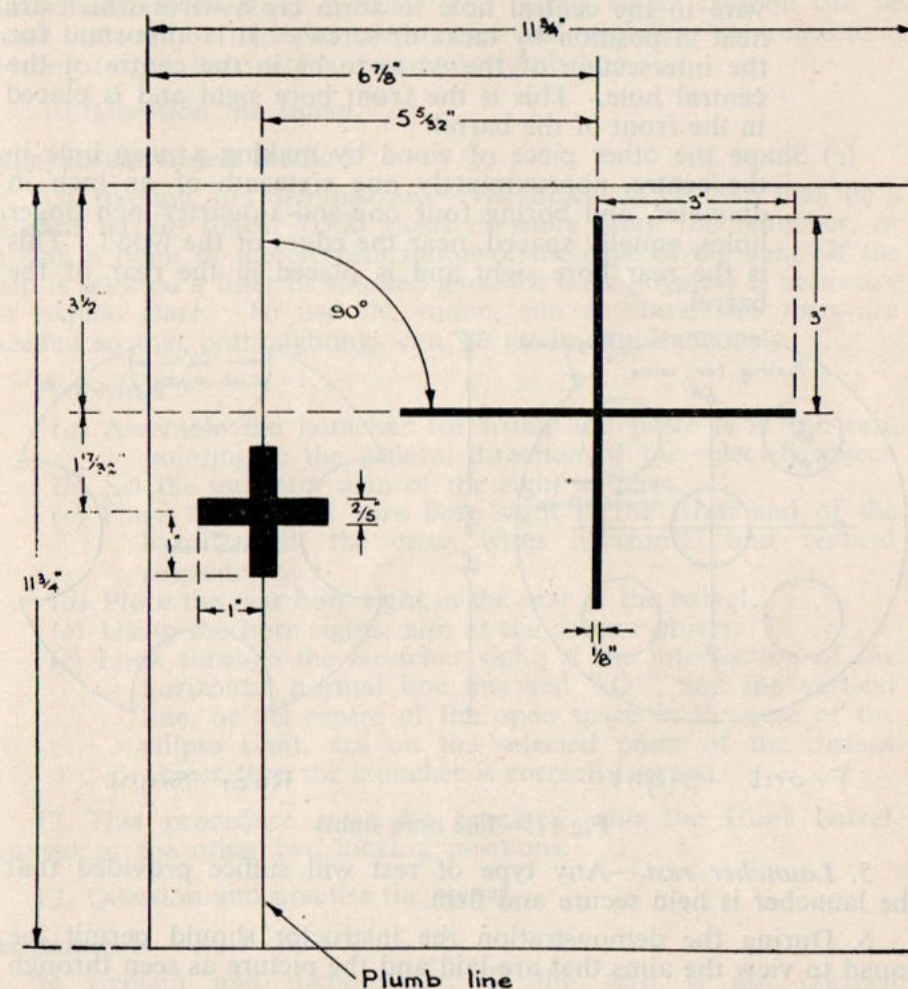


Fig 16.—The testing target

4. *Bore sights*.—These are constructed as follows (see Fig 17):—

- (a) *Materials.*—Two circular pieces of plywood three and a half inches in diameter, four tacks or small screws, two two-and-a-half-inch lengths of thin wire. The circular wooden packing pieces from the HE AT rocket container are suitable, when reduced to the required diameter.



- (b) Shape one piece of wood by boring five three-quarter-inch holes. One of these holes should be dead centre; the other four act as finger holes, and should be evenly spaced near the edges of the wood. Fit the pieces of wire in the central hole to form cross wires which are held in position by tacks or screws. It is important for the intersection of the wires to be in the centre of the central hole. This is the front bore sight and is placed in the front of the barrel.
- (c) Shape the other piece of wood by making a peep hole in the centre, approximately one sixteenth of an inch in diameter, and boring four one-and-a-quarter-inch finger holes, equally spaced, near the edges of the wood. This is the rear bore sight and is placed in the rear of the barrel.

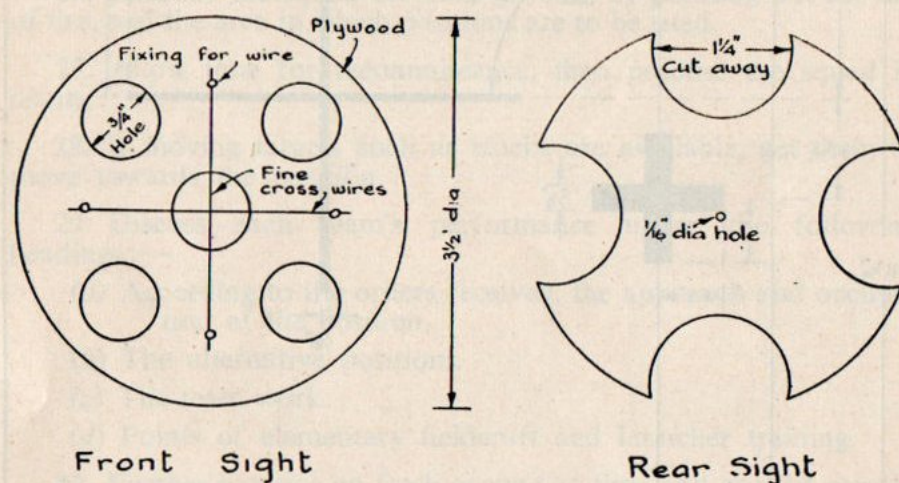


Fig 17.—The bore sights

5. **Launcher rest.**—Any type of rest will suffice provided that the launcher is held secure and firm.

6. During the demonstration the instructor should permit the squad to view the aims that are laid and the picture as seen through the sights.

#### Approach

7. The launcher must be zeroed before firing to make certain that the axis of the barrel and the view through the sights are parallel when the sight is at zero.

#### Methods of zeroing

8. There are two methods of zeroing:—

- The distant object method.
- The testing target method.

9. Both methods are accurate; the method used will depend upon circumstances. The distant object method requires no equipment except the bore sights and the launcher rest, and will be the most usual method used on service. The testing target method can be used indoors or under conditions of bad visibility but requires a testing target, bore sights, rest and plumb line.

10. Question the squad.

#### The distant object method

11. Explain and demonstrate.—The object to be used may be a distant terrain object 1,500 yards or more from the launcher, or a star, a point of the crescent moon or the edge of the sun. If the sun is selected a filter of smoked glass (or dark goggles) is necessary to reduce glare. To use the moon, sun or stars, two men are needed so that both sightings can be made simultaneously.

#### Procedure:—

- Assemble the launcher for firing and place it in the rest, pointing in the general direction of the selected object.
- Set the indicator arm of the sight at zero.
- Place the crossed wire bore sight in the front end of the barrel, with the cross wires horizontal and vertical respectively.
- Place the rear bore sight in the rear of the barrel.
- Using the bore sights, aim at the distant object.
- Look through the launcher sight; if the intersection of the horizontal normal line, marked "O", and the vertical line, or the centre of the open space in the case of the ellipse sight, are on the selected point of the distant object, then the launcher is correctly zeroed.

12. This procedure must be repeated with the front barrel rotated in the other two locking positions.

13. Question and practise the squad.

#### Adjustments

14. Explain and demonstrate.—If the zero is not correct *vertically*, *ie*, if the horizontal normal line marked "O", or in the case of the ellipse, the centre of the "open space", is above or below the object, adjust as follows:—

- Slacken the two screws on the range scale plate, then, keeping the indicator arm at zero, move both sight and plate till the normal horizontal range line, or the centre of the open space, is on, or in line with, the distant object.
- Tighten the screws.
- Check both aims, re-adjust in a similar manner if necessary and re-check.



15. If the zero is not correct for direction, *ie*, the *vertical* line is right or left of the object, adjust as follows:—

- (a) Using a spanner, slacken the hinge nut of the sight, then, with a screwdriver, turn the zero setting hinge stud nut until the vertical line is in line with the target.
- (b) Tighten the hinge stud nut.
- (c) Check both aims, re-adjust if necessary and re-check.

16. The graduated markings on the sight are for reference only.

17. Zero must be checked with the front barrel in each of the three locking positions, after the final adjustment has been made. If the zero is not correct in all three positions, then the launcher requires adjustment by the armourer.

18. Question and practise the squad.

#### Zeroing without bore sights

19. Explain and demonstrate.—If no bore sights are available:—

- (a) Assemble, and place the launcher in the rest, set the sights at zero.
- (b) From a distance of about three feet behind the launcher, place the eye so that the outline of the front opening is centred in the outline of the rear opening of the launcher, with the distant object centred in both.

20. From now on the procedure is exactly the same as when using bore sights.

21. Question and practise the squad.

#### The testing target method

22. Explain and demonstrate:—

- (a) Assemble and place the launcher in the rest, set sights at zero, and fit the bore sights.
- (b) Place the testing target eight feet four inches in front of the leading edge of the sight mounting bracket (error allowed  $\pm \frac{1}{4}$  inch).
- (c) Suspend a plumb line in front of the target and align it exactly on the vertical arm of the smaller thicker cross.
- (d) Look through the bore sight and align the intersection of the cross wires on the intersection of the larger cross.
- (e) Look through the sight:—

- (i) If using the ladder sight the image of the intersection of the normal horizontal line marked "O" and the vertical line must fall *within* the intersection of the vertical and horizontal arms of the smaller, thicker cross. In addition, the vertical line must be in line with the plumb line, and both lines must be *within* the horizontal and vertical arms of the cross.

- (ii) If using the ellipse pattern sight, the centre of the "open space" must fall *within* the intersection of the vertical and horizontal arms of the smaller, thicker cross on the target. In addition, the vertical line must be in line with the plumb line, and both lines must be *within* the horizontal and vertical arms of the cross.

23. Repeat with the front barrel in the other two locking positions.

24. Question and practise the squad.

#### Adjustments

25. Explain and demonstrate.—If the zero is not correct vertically, *ie*, the *horizontal* line is not within the horizontal arms of the smaller, thicker cross, adjust as follows:—

- (a) Slacken the two screws on the range scale plate, then, keeping the indicator arm at zero, move both sight and plate till the horizontal range line falls within the horizontal arms of the cross.
- (b) Tighten the screws.
- (c) Check both aims, re-adjust in a similar manner if necessary, and re-check.

26. If the zero is not correct for direction, *ie*, the *vertical* line is not in line with the plumb line, and not within the vertical arm of the smaller, thicker cross, adjust as follows:—

- (a) Using a spanner, slacken the hinge stud nut of the sight, and, with a screwdriver, turn the zero setting hinge stud nut until the vertical line is in alignment with the vertical arm of the cross and the plumb line.
- (b) Tighten the hinge stud nut.
- (c) Check both aims, re-adjust if necessary and re-check.

27. Check with the front barrel in the other two locking positions.

28. Question and practise the squad.

#### Conclusion

29. Questions to and from the squad.

30. Sum up.



## Section 4.—RANGES AND SAFETY PRECAUTIONS FOR PRACTICE FIRING

### Ranges and targets

1. Any reasonably level ground can be made into a 3.5-inch rocket launcher range, provided that it is large enough to contain the standard danger area.

2. The most suitable target is an old AFV; if none is available, targets may be made of logs, armour plate, or wooden frames covered with hessian.

3. A light or medium tank may be used as a target for practice rockets only. Tanks so used will be closed down.

4. To make a range on which moving targets can be engaged with HE AT rockets is likely to be an expensive undertaking. Moving targets will therefore normally be engaged with practice rockets.

### Range precautions

5. These precautions apply to the firing of HE AT and practice rockets except where otherwise indicated.

6. Precautions to be observed are:—

- (a) \*Everyone in the danger area, including firers, instructors, waiting details and spectators, will be behind blast-proof cover or in a trench, and will wear steel helmets.
- (b) The back blast area—a triangle with a height and base each 25 yards long, the apex of which is the rear end of the launcher—will be kept clear of men, ammunition, stores and equipment.
- (c) The “ready line”, where waiting details are organized with their stores and equipment, will be at least 30 yards behind the firing point. No one will move forward of the “ready line” without the permission of the conducting officer.
- (d) Launcher teams will be given their rockets on the “ready line”, and will inspect both them and their other equipment. They will see that rockets are protected from the direct rays of the sun.
- (e) A medical orderly will be in attendance with first aid equipment and, if possible, an ambulance.
- (f) All danger flags will be raised; look-out men will be posted; and the whole of the danger area must be clear of people and livestock.

(g) Each launcher will be supervised by an officer or NCO who:—

- (i) has successfully passed a course on the rocket launcher at an Army or Command School, or
- (ii) has successfully passed a unit course on the rocket launcher under an instructor who has qualified as in (i) above.

The supervisor will control the firers throughout the practice, and ensure that the launchers are always pointing towards the target area.

- (h) No weapon will be loaded and no one will fire without a direct order from the conducting officer, who will be present throughout the firing.
- (j) No launcher will be moved back from, and no one will approach or leave, the firing points without permission from the conducting officer.
- (k) All loading, unloading and inspection of ammunition will be carried out in correct firing positions.
- (l) Misfires will be unloaded on the order of the conducting officer only.
- (m) Rockets will not be fired outside their safe temperature limits. These limits are marked on the motor in red inside a red circle.
- (n) Nos. 1 and 2 will wear face masks for all firing, as a protection against particles of unburnt propellant that may come back from the rocket as it leaves the muzzle of the launcher. Anti-gas eye-shields and a camouflage face veil give adequate protection.
- (o) \*A NCO will be detailed to count all rockets fired and the number of explosions that take place. He will carefully note the positions of all blinds.
- (p) The launcher will not be fired with any substantial solid object within 25 yards behind it. If it is fired from a trench, it is important to see that there is a clear space immediately behind the launcher.
- (q) \*During training no target will be engaged at a distance of less than 100 yards.

NOTE.—Paragraphs marked \* apply to practice with live rockets only.



(a) *The target area:—*

- (i) This is the area within which targets may be set up and engaged.
- (ii) Its length is constant and extends from a point 100 yards from the firing point (the shortest range at which it is permitted to engage a target) to 1,000 yards from the firing point (approximately the maximum range of the launcher).

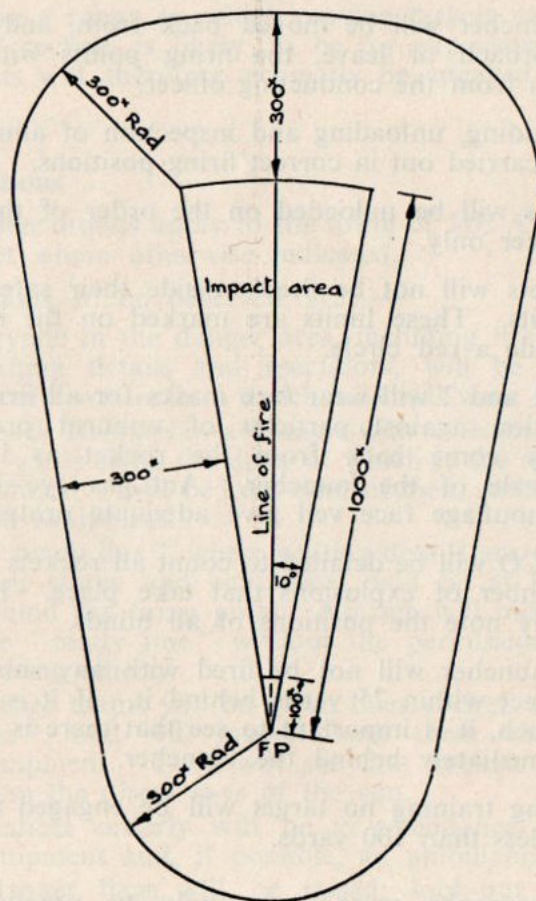


Fig 18.—Danger area—stationary targets—single line of fire

- (b) *The impact area:—*

- (i) This is the area in which rockets are liable to fall.
- (ii) Its length is constant and extends from the firing point for 1,000 yards.
- (iii) Its area comprises the whole of the segment of a circle which is the *target area*, with the addition on either side of it of ten degrees if targets are to be stationary, or 20 degrees if they are to be moving.

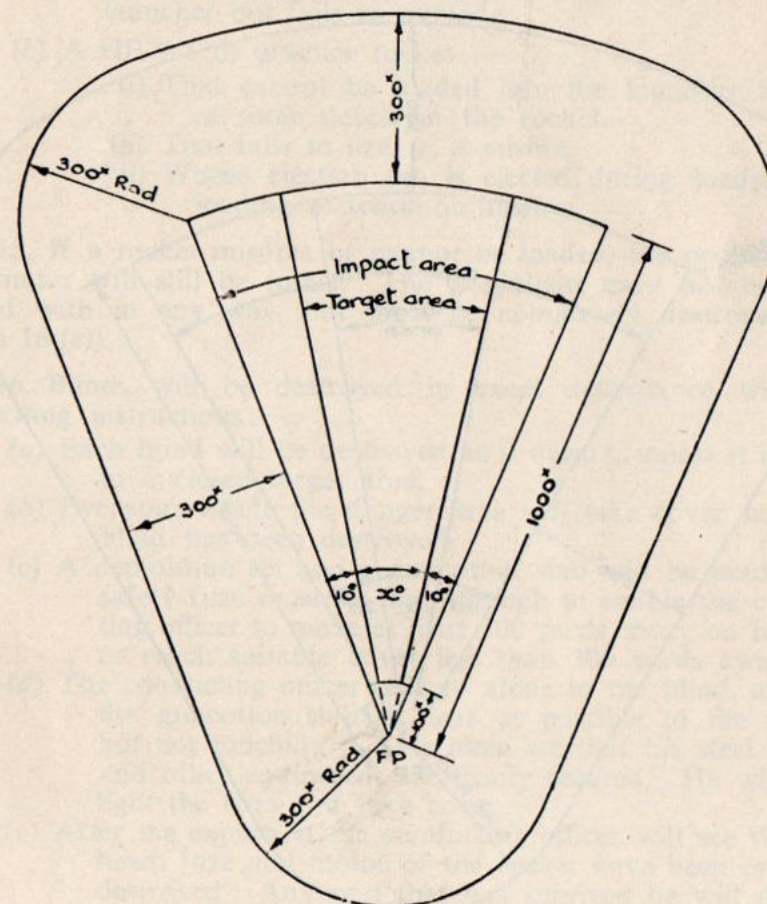


Fig 19.—Danger area—stationary targets—arc of fire



(c) *The fragmentation area or "danger burst" area.*—This consists of a belt of ground 300 yards wide lying immediately outside the impact area.

8. A template for the danger area of a range that has a single line of fire for use with stationary targets is shown at Fig 18.

9. To determine the danger area when stationary targets are to be engaged within an arc of fire, apply the Fig 18 template with the line of fire along first one, then the other flank line of the target area. All ground which has been covered by the template in this way is the danger area. An example of the result is shown as Fig 19.

10. When moving targets are to be engaged, the procedure is the same as that described in para 9 above, except that the line of fire of the Fig 18 template must be applied ten degrees outside the flank lines of the arc of fire. An example of the result is shown as Fig 20.

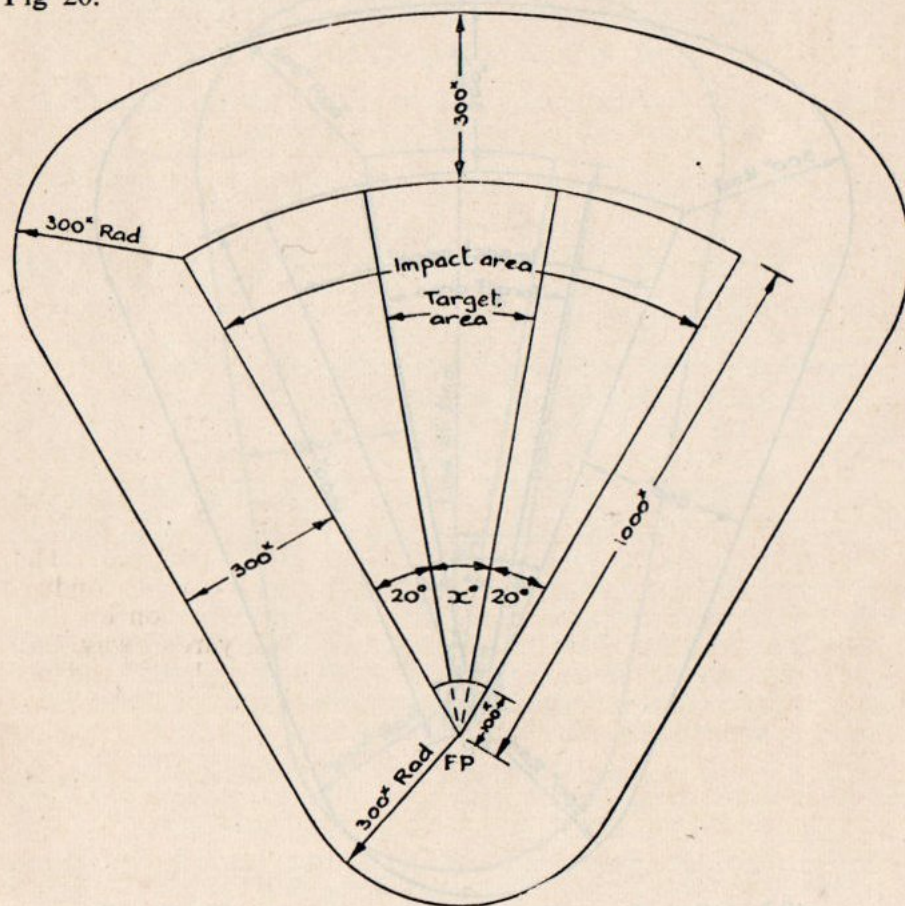


Fig 20.—Danger area—moving targets

11. The limits of the arc of fire should be marked on the ground by tall posts, each with the distinguishing letter "X" or "O" at the top.

12. When practice rockets are to be fired the danger area will consist of the whole of the *impact area* described in para 7 (b) above, but no *fragmentation area*.

### Blinds

13. See Infantry Training, Volume III, Pamphlet No. 31, Range Work—General (All Arms), 1948, Appendix C. The demolition equipment listed in this Appendix will always be taken on to the range.

14. A blind is:—

- (a) A HE AT rocket that leaves or partially leaves the launcher but fails to explode.
- (b) A HE AT or practice rocket:—
  - (i) That cannot be loaded into the launcher because of some defect in the rocket.
  - (ii) That fails to fire, *ie*, a misfire.
  - (iii) Whose ejection pin is ejected during loading, unloading or action on misfire.

15. If a rocket misfires or cannot be loaded, the propellant in its motor will still be intact. The propellant must not be interfered with in any way, but must be *completely* destroyed (see para 16 (e)).

16. Blinds will be destroyed in exact accordance with the following instructions:—

- (a) Each blind will be destroyed as it occurs, unless it is lying in a closed target area.
- (b) Everyone inside the danger area will take cover until the blind has been destroyed.
- (c) A demolition set and a guncotton slab will be used. The safety fuze must be long enough to enable the conducting officer to move at least 300 yards away on his feet, or reach suitable cover less than 300 yards away.
- (d) The conducting officer will go alone to the blind, and put the guncotton slab as near as possible to the rocket, but not touching it. He must see that his steel helmet and other equipment are firmly secured. He will then light the fuze and take cover.
- (e) After the explosion the conducting officer will see that the head, fuze and motor of the rocket have been properly destroyed. Any part that has survived he will destroy where it lies.



(f) Misfires and defective rockets may be put carefully aside, well away from the ready line and other rockets, and destroyed one at a time when firing has finished. They must be destroyed at least 300 yards away from the edge of the danger area.

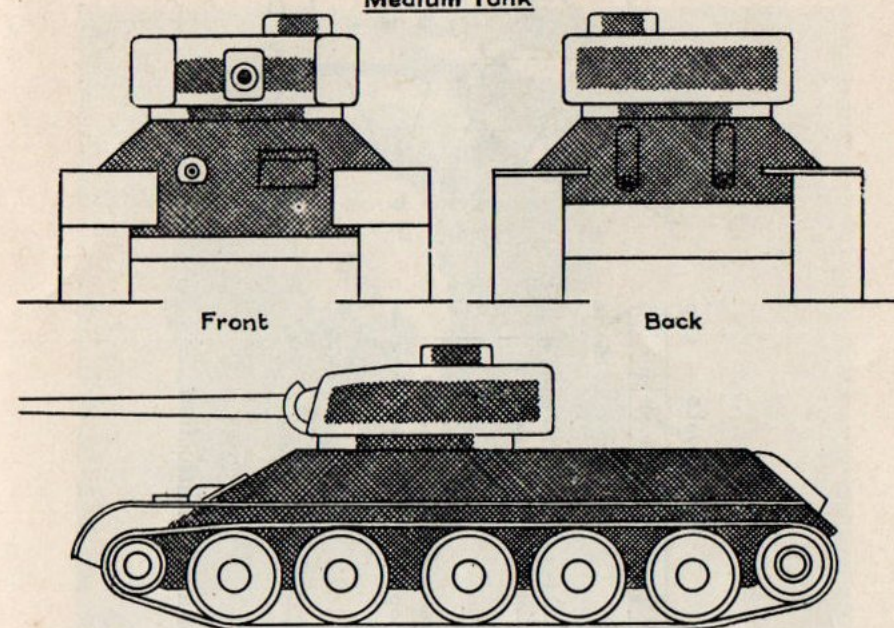
(g) In the unlikely event of a blind that falls outside a closed target area burying itself in the ground, the conducting officer will:—

- (i) Mark its point of entry into the ground.
- (ii) Set up a new target at least 20 yards from the blind before he allows firing to start again.
- (iii) Set up a notice board "*Danger—keep away*", and, if civilians have access to the area, warn the police.
- (iv) Inform the Inspecting Ordnance Officer, who will destroy the blind.

17. All blinds and other defects will be reported to the Inspecting Ordnance Officer, together with the lot number of the rockets concerned.

## ATTACK THE SHADED PARTS

Medium Tank



Heavy Tank

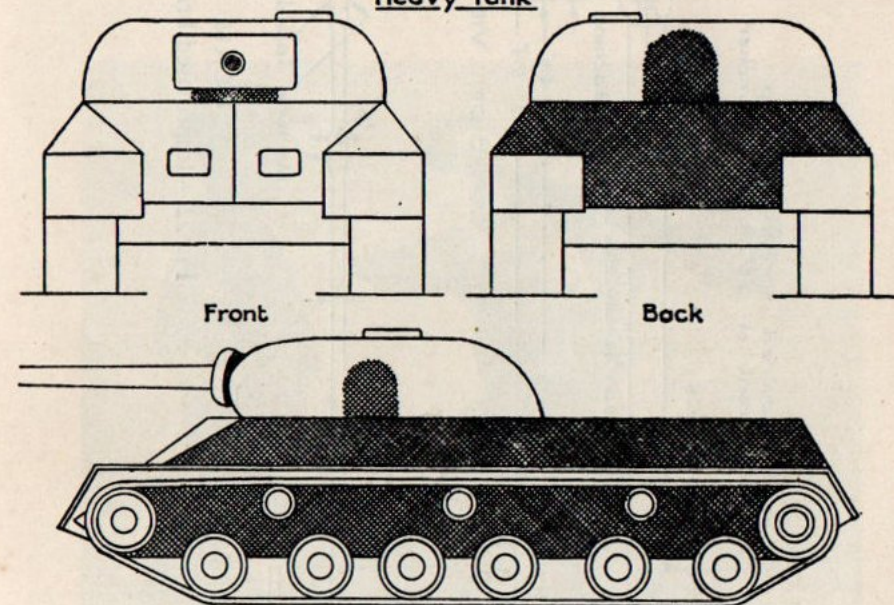


Fig 21.—Vulnerable parts of a tank



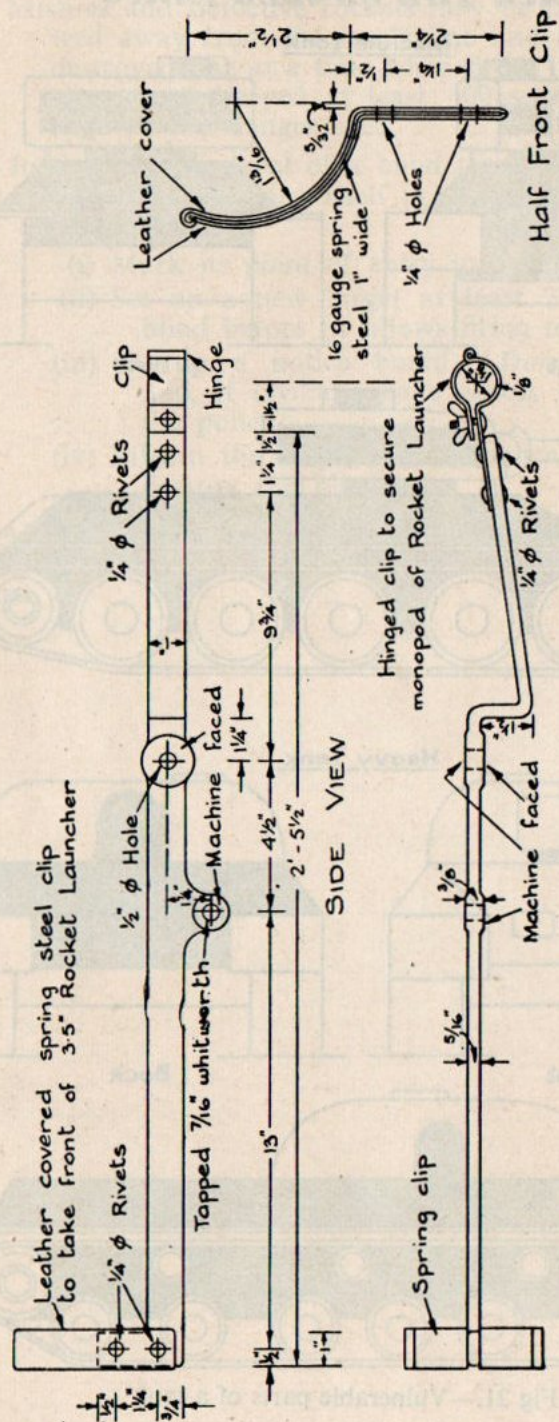


Fig 22.—Improved bracket for aiming instruction

PLATE 6.—First kneeling position



PLATE 7.—Second kneeling position





PLATE 8.—Removing the safety band

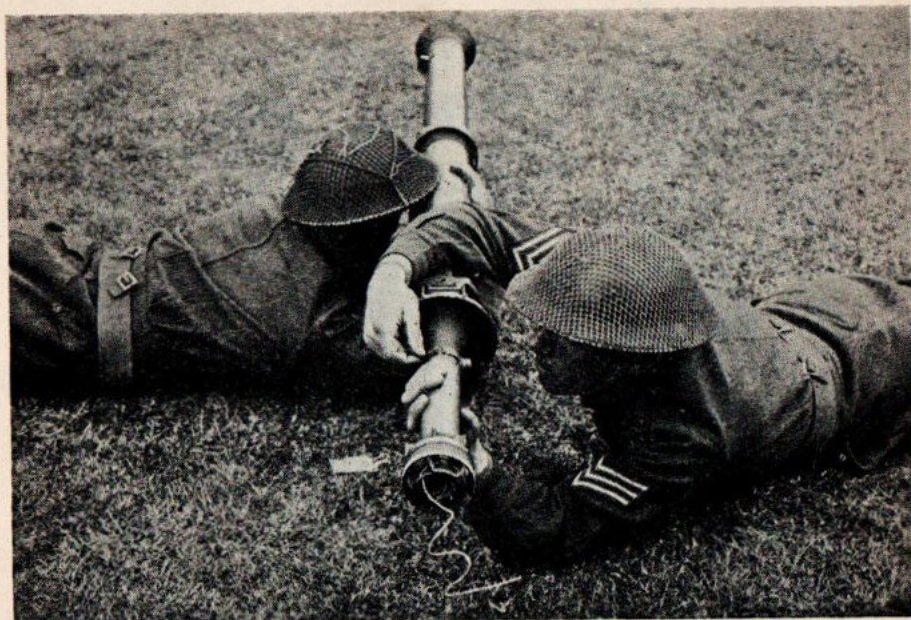


PLATE 9.—Securing the long contact wire to the contact spring

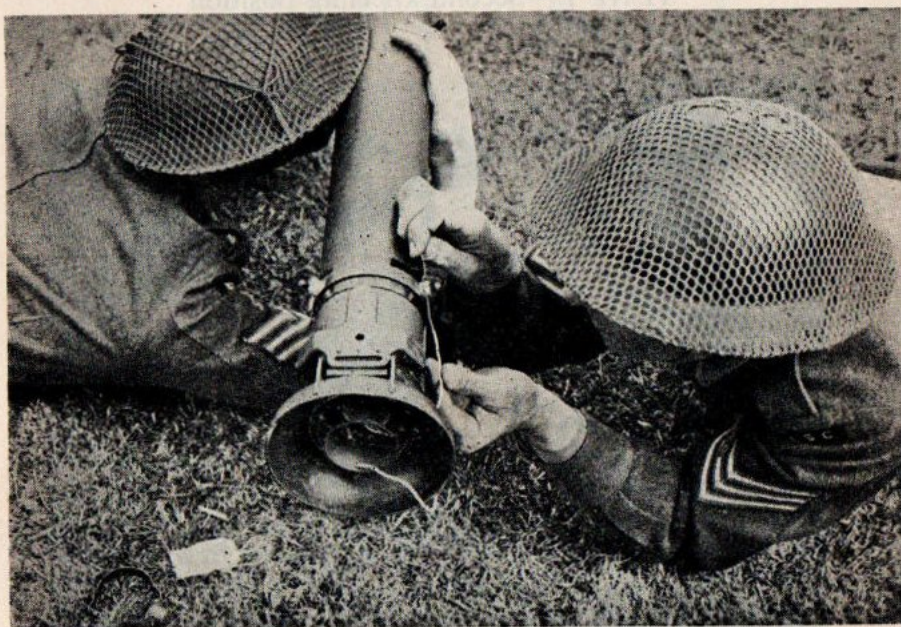


PLATE 10.—First sitting position



PLATE 11.—Second sitting position

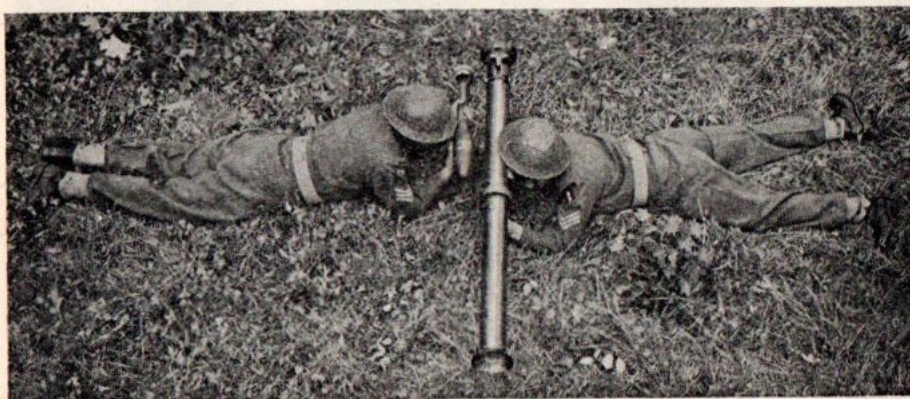




PLATE 12.—The standing position



PLATE 13.—The lying position



## Summary

## LESSON PLAN

Aim To teach assembly stripping care and cleaning of 3.5 in R.L.

Stores and aids	3.5 RLs, cleaning rags oil and drill sockets diagrams	
Place of Work and Layout	W T H $\begin{matrix} RL & RL \\ & X & RL \end{matrix}$	
Prelims	No line or Prac R.s around	
Revision		
Approach	35 RL provides pl with light effective anti tank weapon	
Sequence	Method of conducting & formation	Instructors Notes
Characteristics	Speak 1st Q.A.	Diagrams if avail
Assy and Strip	Expl Demo	
Care and Cleaning	Expl Demo Prac	
Rockets	Describe	
Packing	"	
Gen function of Rocket	Describe	
<u>Conclusion</u> Questions to & from Squad	Q.A.	

## PACK UP KIT

## Summary

Pl weapon etc.



RESTRICTED